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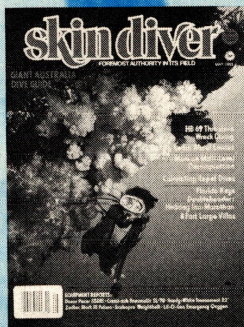
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skin diver

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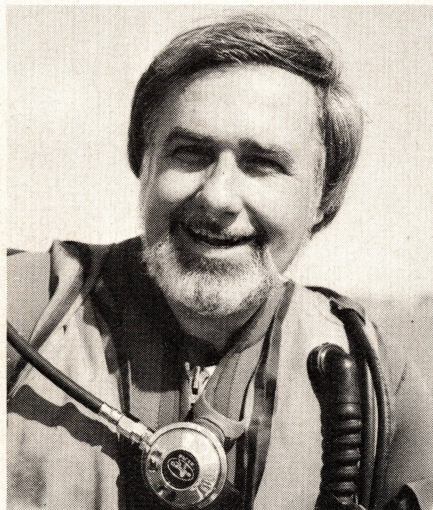
COVER

Australian diver Jenny Henderson views the beautiful array of soft corals found along the drop-off at Flinders Reef in the Northern Coral Sea. Geri Murphy took the photo with a Nikonos III camera and 15 mm lens, Oceanic 2001 strobe, E64 film. For more on this exciting area, see the Australia section on page 73.

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SDM Editorial

BY THE PUBLISHER



A new arrival at a Caribbean resort joins the dive boat for a morning trip to the drop-off. The divemaster scrutinizes his guests on the way out and silently thinks to himself, "this guy should be no problem." The diver is approximately 40 years old, from California, has been diving eight years, and holds a certification card from a prestigious training association. He seems to know what he's talking about and has been diving in a number of exotic spots such as Truk Lagoon and the Red Sea. He appears in good physical condition and talks about jogging and playing racquetball.

Once the boat is anchored, the diver takes his time getting his well worn equipment together. As he gets into his gear he appears a little nervous. He is the last one off the boat, except for the two advanced students who are working out their repet dive profile with their instructor. Finally, he makes his entry and starts down the anchor with a slight current tugging at his body. His appointed dive buddy is 15 feet ahead on the same line.

At precisely 28 feet things begin to go wrong. The diver has difficulty clearing his ears. Frustrated by the inability to equalize, he clumsily attempts to turn around on the descent line. The rim of his facemask catches on the line and floods half full with water. Caught off balance by the current, the diver attempts to tilt his head backward and clear his mask. The angle is wrong and a shot of seawater goes up his nose and into his sinus. With knee jerk reflex, the diver lets go of the

REENTRY: DIVING'S MOST DIFFICULT MANEUVER

descent line and starts thrashing his way to the surface. He breaks through the water canopy, spits out his mouthpiece, and rips the flooded mask off his face. By now the current has carried him past the stern of the dive boat. His coughing and gagging attracts the attention of the instructor who jumps into the water and drags the diver back to the ladder.

How is it possible that a well trained, certified diver with years of experience could have such a problem with basic scuba skills? Still gasping from the near miss, the diver solves the riddle by blurting out, "I blew it. I guess I'm a little out of practice. I haven't been in the water in the last 18 months."

Reentry into the sport, after a long period of inactivity, is perhaps one of diving's most difficult maneuvers. No matter how extensive or rigorous the original scuba training, the human body tends to forget with time. Skills and timing fade into dim memories and self-confidence ebbs like the tide. Yet most divers don't seem to realize that they are rusty. The process is subtle. It is only when the diver is fully suited up and balanced on the edge of the dive boat that he realizes he is not as well prepared as he should be.

Reentry is a serious safety problem at dive resorts and on local dive boats as well. In fact, it may very well be one of the major contributing factors to this sport's present credibility gap in the C-card system. Graduates of 12 to 20 week scuba courses are turning up at dive resorts and are acting like complete neophytes. Their C-cards do not reflect a true picture of their dive status. As one divemaster put it, "I really don't care about the date of the customer's first dive—I want to know the date of the last dive."

How can the dive industry cope with this growing problem? The first step is to recognize it for what it is and to realize that the situation has the potential of growing worse. The good news is that scuba reentry is a solvable problem. Once it is fully recognized by the diving public and understood by the resorts and divemasters, measures can be taken to relearn old skills. Here are just a few examples of what is being done today:

1) This year PADI introduced a refresher course called *Scuba Review*. It consists of a special self-study textbook, instructor review of basic scuba skills and an optional open water dive for environmental orientation. The program was greeted with such enthusiasm that the first 10,000 copies of the workbook sold out in the first two months.

2) Human Underwater Biology (HUB), an organization specializing in travel and medical education, has come up with a unique way of coping with the scuba reentry problem. Each traveler is sent a packet of pre-trip information containing a set of dive tables and a mini-exam with five repetitive dive problems. Customers practice their repetitive dive calculations before they reach the resort. They become proficient in figuring repet group letters and maximum bottom time. A lecture on personal diving safety is given the morning of the first day at the dive resort, prior to any open water activity.

3) At the Flamingo Beach Hotel, Dive Bonaire starts every new week with a walkaround orientation and a warm up dive. At 9:30 am every Sunday morning, new arrivals are conducted on a walk-through orientation of the dive shop procedures, tank location, dive boat rules and basic equipment requirements. At 10:30 am guests make a warm up dive from the pier directly in front of the hotel. The gradually sloping bottom and calm surface provide an ideal environment for gentle reentry into diving. Instructors stand ready on the pier for assistance with gear as well as rescues if needed.

4) Many dive stores throughout the U.S. are now promoting local dives as a method of staying in shape between trips to the ocean. Events such as underwater Easter egg hunts, Thanksgiving turkey dives, Halloween U/W pumpkin carving contests and treasure hunts help to turn ordinarily dives into social events.

If techniques such as those listed above are conducted on a national basis by all dive stores, instructors and dive resorts, this sport can successfully combat the reentry problem. More diving on a regular basis is the key to a safer sport. 



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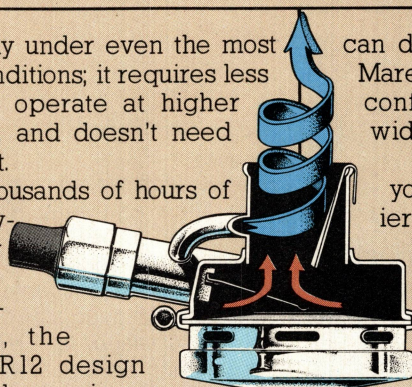
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Diver's Calendar

May 1 Third Annual Divers Day, General Dynamics Missile Park, San Diego, CA. Movies, lectures and new and antique gear show and sale. (Contact: Gene Gunn (619) 277-8900 X2420)

May 6-8 Our World-Underwater XIII film festival, Hotel Continental (formerly the Radisson-Chicago), and the Medinah Temple, Chicago, IL. Films, slides, lectures, diving developments, parties and more. (Contact: Our World-Underwater, P.O. Box 4428, Chicago, IL 60680)

May 7 The 19th Annual International Underwater Film Festival at the Paramount Theatre, Oakland, CA. Master of ceremonies will be Jack McKenney. Door prizes. (Contact: Underwater Photographic Society (415) 465-6400)

May 7-8 Third Annual Carp Shoot and Underwater Navigation Contest, sponsored by the Dolphin Divers of Sacramento and Lake Comanche North Shore Resort. Prizes to winning teams. (Contact: John Payne, 4105 South Market Ct., Sacramento, CA 95834)

May 13-15 Sixth Annual Miracle Strip Open Spearfishing Tournament, Panama City, Florida. Sponsored by the Panama City Dive Club. (Contact: Panama City Dive Club, Mike Meints, President, P.O. Box 4636, Panama City, FL 32401)
May 15 Scuba Divers Swap Meet, sponsored by the Southwestern Connecticut Skin Divers Inc. (SE-CONN). No admission, open to the public, and dealers welcome. At the Montville American Polish Club, Montville, CT. (Contact: Brian Johnson (203) 599-3484)

May 19, 21 & 22 Scuba refresher seminar, Glendale Family YMCA, Glendale, CA. (Contact: Glendale Family YMCA (213) 240-4130)

May 21-28 Annual Meeting and Diving Course for Physicians on Grand Cayman. Sponsored by the International Society of Aquatic Medicine (ISAM). (Contact: Michael Rosco, M.D., 1127 Wilshire Blvd., Los Angeles, CA 90017)

May 23-25 Third Annual Search and Recovery Seminar at Howard Johnson's North in Cincinnati, Ohio. Sponsored by the Hamilton County Police Association. New Topics. Certificate upon completion. (Contact: Ptl. Mike Wylie or Roger Petrey, c/o Amberly Village Police, 7149 Ridge Road, Cincinnati, OH 45237)

May 28 The 21st National Speleological Society Cave Diving Safety Workshop, Branford, FL. Everyone invited. (Contact: Chairman Jack Rensch, National Speleological Society, 2969 Daisy Lane, Columbus, Ohio 43204)

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Film Festivals 'n Symposiums

OUR WORLD-U/W XIII

Our World-Underwater (May 6-8), celebrating its 13th year, will present Jean-Michel Cousteau along with Dr. Sylvia Earle, Bill Lovin, Stan Waterman, Chuck Nicklin, Ozzie Wissell and other well known speakers.

The Seminars will be held at the Hotel Continental (formerly the Radisson Chicago) 505 North Michigan Avenue—nestled within Chicago's Magnificent Mile.

The underwater Film Festival will be held at the Medinah Temple, 600 North Wabash Avenue, near the hotel.

Ticket prices are: Friday night cocktail party, \$9—Saturday seminars, \$13—Saturday evening film festival, \$9—Sunday workshops and seminars, \$8. A package ticket (all inclusive to above plus two pool parties) is \$35. Only 300 scholarship banquet tickets will be sold.

For additional information phone (312) 989-2939. ✕

SEASPACE 1983

The Houston Underwater club (HUC) of Houston, Texas will hold its Seaspace Colloquium June 24-26 at the Shamrock Hilton Hotel in Houston. The event will include lectures and symposiums, luminaries of the dive world, 10,000 square feet of exhibit space (with over 75 booths), an international underwater photo contest, and a film festival. Once again, Seaspace will be preceded by the annual board of directors meeting of the Underwater Society of America.

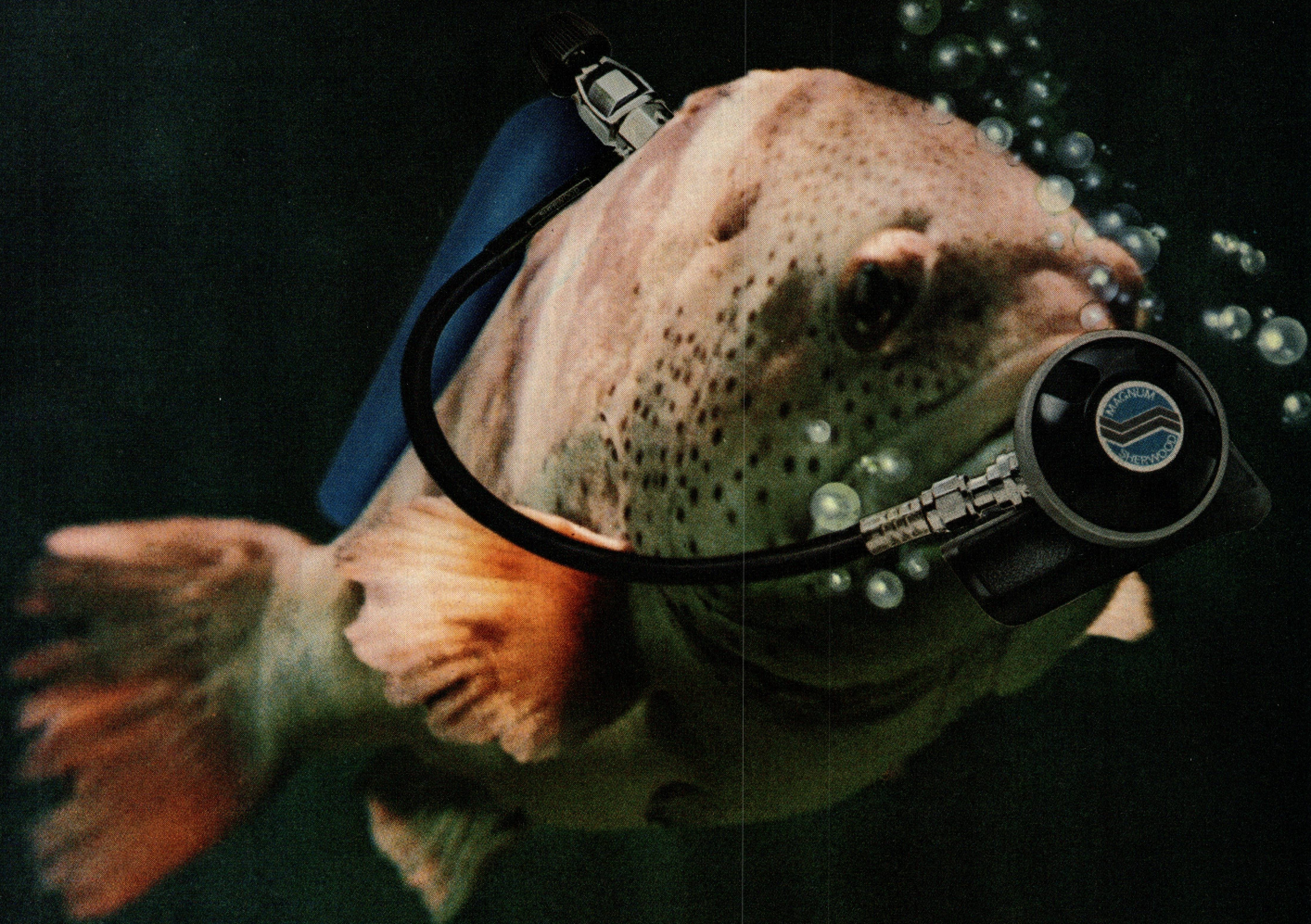
To further promote interest in Seaspace, the Houston Area Diving Retailers Association will offer a free introduction to scuba in the Shamrock's pool.

Sponsored biannually by HUC, Seaspace is organized on a non-profit basis and is supported by all aspects of Houston's sizable diving community. Proceeds from the Seaspace effort are channeled into a marine related scholarship program administered by the club.

For further information about Seaspace, including tickets, schedules, speaking engagements, booths for manufacturers representatives, and applications for the international U/W photo contest, please contact Seaspace, P.O. Box 3753, Houston, Texas 77253. ✕

FAIRFIELD FILM SHOW

May 14 marks the date of the First Annual Fairfield Scuba Club Film Show. The event will be held in Fairfield, CT. For information contact Kim Remetta, 268 Toll House Lane, Fairfield, CT 06430. ✕



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CABRILLO MUSEUM EXPO

The Cabrillo Marine Museum will hold its Second Annual Marine Awareness Expo on Saturday, May 21 from 9:00 am to 5:00 pm at 3720 Stephen White Drive, San Pedro, CA. This will be a day of science, information and marine photographic art.

A marine life photo contest and film festival and booths, displaying many aspects of diving, photography, marine life and travel will highlight this event. The museum has hundreds of displays and 34 marine aquaria. For more information call (213) 548-7562. 🌿

LOVIN FILM

Moments, a new film by underwater cinematographer Bill Lovin, takes viewers on an excursion into the erotic ocean. *Moments* draws viewers into the beautiful, serene and intimately sensual environment of the tropical sea. The film fea-



tures model Susan Abbott and was photographed entirely on the spectacular drop-offs and deserted beaches of San Salvador Island, Bahamas.

Moments is rated R. It is available in 16 mm and 35 mm versions exclusively from Marine Grafics, Box 2242, Chapel Hill, NC 27514. 🌿

STONEMAN FILMS

Canadian underwater filmmaker John Stoneman has recently completed work on two television documentaries entitled *The Coral Kingdom* (filmed off Belize) and *Sea of Cortez* (filmed off Baja). He has also completed work on a 12 minute scuba instructional film for the disabled for NAUI (Canada). 🌿

MILITARY PHOTO CONTEST WINNER

The winner of the 1982 All Military Photo Contest for best over-all was Steve Purdy of the K.K.M.C. Desert Divers stationed with the Army in Jeddah, Saudi Arabia. The winning slide, shot in the Red Sea with a Nikonos IV with 1:2 extension tube, also took top honors in the macro division. The Grand Prize of an Oceanic 2000 strobe was donated by Oceanic U.S.A. 🌿

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SKIN DIVER MAY 1983 11

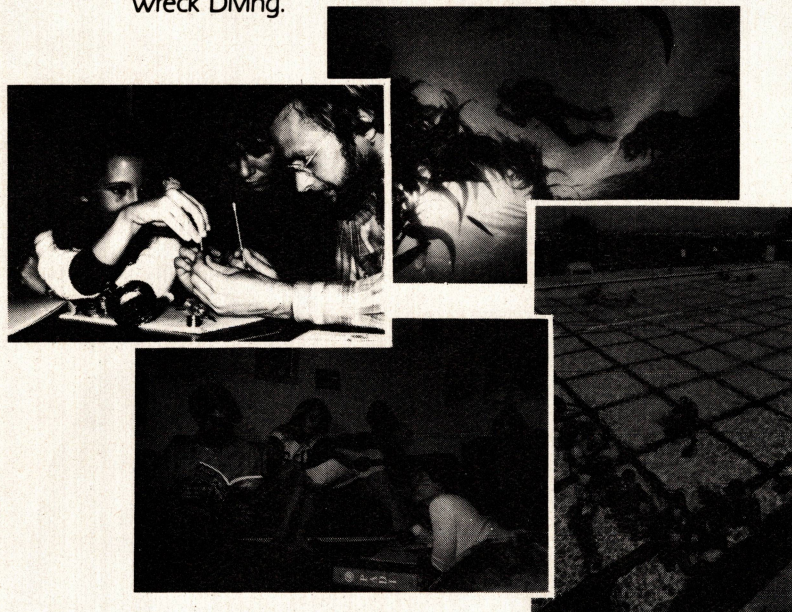
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Rx FOR DIVERS BY FRED BOVE, M.D., PH.D.

Rx for Divers in March discussed multi-level diving and presented some general concepts based on diving, practiced in limited circumstances in commercial offshore operations.

While we referred to the University of Pennsylvania Institute for Environmental Medicine as a source of information, it was not clear in that article that the Institute, a leader in decompression theory and development of dive tables, had stressed that its analysis showed many combinations of two level diving to be unsafe and to cause an unacceptable risk of decompression sickness.

The fact that some divemasters, through experience, have developed some safe multi-level dive profiles does not mean that these special procedures can be applied to any multi-level dive.

Because of this risk of decompression sickness, use of the U.S. Navy No Decompression Tables to devise multi-level sport diving decompression procedures as described in the March issue is not an accepted safe diving procedure.

This month Rx for Divers reviews skin problems that can occur from diving. This article is written by Dr. Cynthia Modny, a dermatologist practicing in Montclair, New Jersey. Doctor Modny is trained in undersea medicine through the National Oceanographic and Atmospheric Administration (NOAA) Physicians Program in Diving Medicine.

SKIN PROBLEMS AND DIVING

While serious medical problems such as decompression sickness and dive accidents luckily are rare occurrences, skin problems are very common

(Continued on Page 16)

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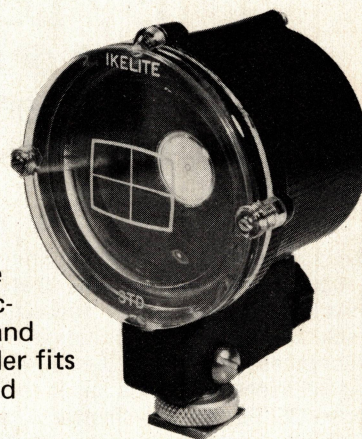
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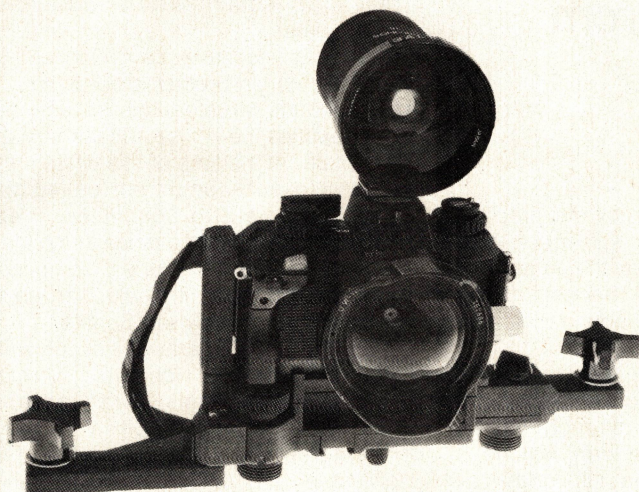
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Wreck Diving Threatened By Legislation

Will sport divers be banned from
American wrecks

BY ELLSWORTH BOYD

I'm devoting the entire column this month to a crucial matter that concerns the future of every serious shipwreck diver in the United States:

Congressman Charles Bennett, Democrat, Jacksonville, Florida has introduced House Bill 69, an anti-shipwreck diving bill that if passed could make wreck diving obsolete. The wordy and confusing ten page bill calls for a \$10,000 fine for, "any person who excavates, salvages, appropriates, or injures any shipwreck subject to jurisdiction, control, and power of disposition of the United States under section 1-a."

The bill provides for the transfer of shipwrecks to state jurisdiction, which leaves interpretation, regulation and enforcement in the hands of state bureaucrats, most of whom know little about diving and less about shipwreck control. Most divers fear that state officials will over-regulate shipwrecks with hostile, punitive and unrealistic regulations that might include permits, licenses and special sanctions. Dive shop owners and charterboat captains who depend on wreck sites for their livelihood could very well be put out of business if this bill were signed into law.

The first paragraph of Bennett's House

Bill 69 states: "It is hereby declared that any abandoned historic shipwreck located, in whole or in part, on the outer Continental Shelf or on lands beneath navigable waters within the boundaries of a State is the property of the United States and is subject to its jurisdiction, control and power of disposition as provided in this Act." Notice how strongly worded this bill is, and note the term, historic.

Near the end of the bill, under the heading, Definitions, it says: "The term 'historic shipwreck' means a wrecked vessel which was constructed more than 100 years before the date of the enactment of this Act, and the term 'abandoned historic shipwreck' means a historic shipwreck with respect to which each owner has ceased to claim and exercise any right, title and interest." Although this bill appears to limit the states' authority to ships constructed 100 years ago, divers are concerned that the term historic is relative. A wreck that you and I dive on may never be accessible to our offspring because by the time they are old enough to dive it, the wreck will have reached its 100 year old status and will be off-limits, except to state archaeologists. Most wrecks are not historical anyway, but believe me, some old clunkers

that we might not look at twice, could be declared "rare historical finds" under this tyrannical Bennett bill. Not one wreck in 1000 is of particular historical or archaeological value, but it's difficult to convince non-diving Washington politicians of this.

Under the title, State Plans, one section of the bill says: "A State plan meets the requirements if it provides for the location, protection, salvage, restoration, and preservation of each abandoned historic shipwreck located, in whole or part, on lands beneath navigable waters within the boundaries of that state, and for this purpose requires a suitable State agency to: 1. Assume custody of each such shipwreck; 2. To regulate the location, salvage, restoration, and preservation of each such shipwreck; 3. To employ one or more archaeologists as the agency shall prescribe, to assist the agency in performing its duties under the plan."

The Bennett bill becomes more frightening on page seven under the title, Enforcement, where it specifically declares a \$10,000 fine for violators. As well as defining historic shipwreck, the bill defines: vessel, outer continental shelf, land beneath navigable waters, boundaries, state, secretary, person, local government unit, administrator, and rule. Enough said!

Now that you have a working knowledge of what big brother is up to, it rests in your hands to defeat this travesty before it reaches the House and then, finally the Senate. At the time of this writing, the bill is in a sub-committee called the Oceanographic Sub-Committee. If approved, it would then advance to the Merchant Marine and Fisheries Committee and if passed there, it would then go to the House, and finally the Senate.

Therefore, it is imperative that you write immediately to The Honorable Norman D'Amours, Chairman, Oceanographic Sub-Committee, House Office Building, Washington, D.C. 20515, and to The Honorable Barbara A. Mikulski, Oceanographic Sub-Committee, 407 Cannon House Office Building, Washington, D.C. 20515. Tell Mr. D'Amours and Ms. Mikulski that you vehemently oppose Charles Bennett's House Bill 69 and ask them to forward a copy of your letter to the Merchant Marine and Fisheries Committee.

If you would like a copy of House Bill 69, send me \$1.40 (cost of photocopying and postage) and I will send it to you. Meanwhile, see if you can get some of your dive buddies to write Mr. D'Amours and Ms. Mikulski.

By banding together in a united front, we might be able to defeat this asinine proposal and let the bureaucrats in Washington know that we will regulate ourselves, as we have successfully done for many years. Ellsworth Boyd, Rt. 2, Box 408, White Hall, MD 21161. 

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RX FOR DIVERS

(Continued from Page 12)

in the diving community. They are annoying, sometimes prevent a day or two of diving and certainly reduce the pleasure of a dive trip.

Since the skin is the largest organ of the body, with so much exposure to its environment, a lot can happen to it while diving. We have all seen "old war wounds" on many divers which may be thought of as a mark of courage or rite of passage. But it is probably prudent to try to avoid these annoyances. The most obvious way to do so is by wearing a full wetsuit. Even in warm Caribbean waters a full one-eighth inch wetsuit will not overheat the typical sport diver and definitely prevents hypothermia. If your budget can't handle this, wear a tightly woven long sleeve shirt and jeans. Always wear gloves, unless you are very knowledgeable and experienced in marine biology and know what you can touch without problems. The inexpensive, heavy duty, garden gloves work well. After a dive, wash your suit well to remove debris and to keep it in good condition. If your skin is well protected, it is unlikely that you will get into difficulty with the following types of marine life.

Sea anemones can produce itchy, burning, urticaria (hives) and some species can cause systemic symptoms such as headaches, nausea, vomiting, fever, chills and muscle spasm. So look, photograph, admire, but don't touch.

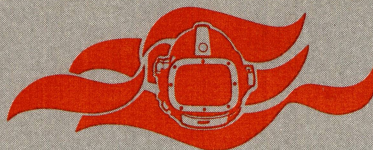
Fire sponges can cause swelling, stiffness and discomfort in the part of the body stung. Fortunately, this usually goes away on its own within two days, but may leave you in the hotel for the duration.

A sea cucumber can sometimes give you a mild dermatitis—not a problem if you carry some cortisone cream.

Fire coral is the usual producer of the "Red Badge of Courage" among divers. For novice divers, this organism is sometimes difficult to identify because of its varied appearance. It usually is off-white in color and can resemble finger-like projections, round masses, or can cover other coral like a smooth blanket. Perhaps the best way to recognize it is to take up macro photography and notice the fine projections all over the organism. These nematocysts or stinging capsules are the source of the potential problem.

Many types of jellyfish can inflict anything from painful skin lesions all the way to shock and death. Most, including the Portuguese man-of-war, fortunately, usually produce only skin problems. The Portuguese man-of-war is rarely fatal. It consists of stings, burning and numbness in the area with linear arranged hives to ulcerations. Because its tentacles can be

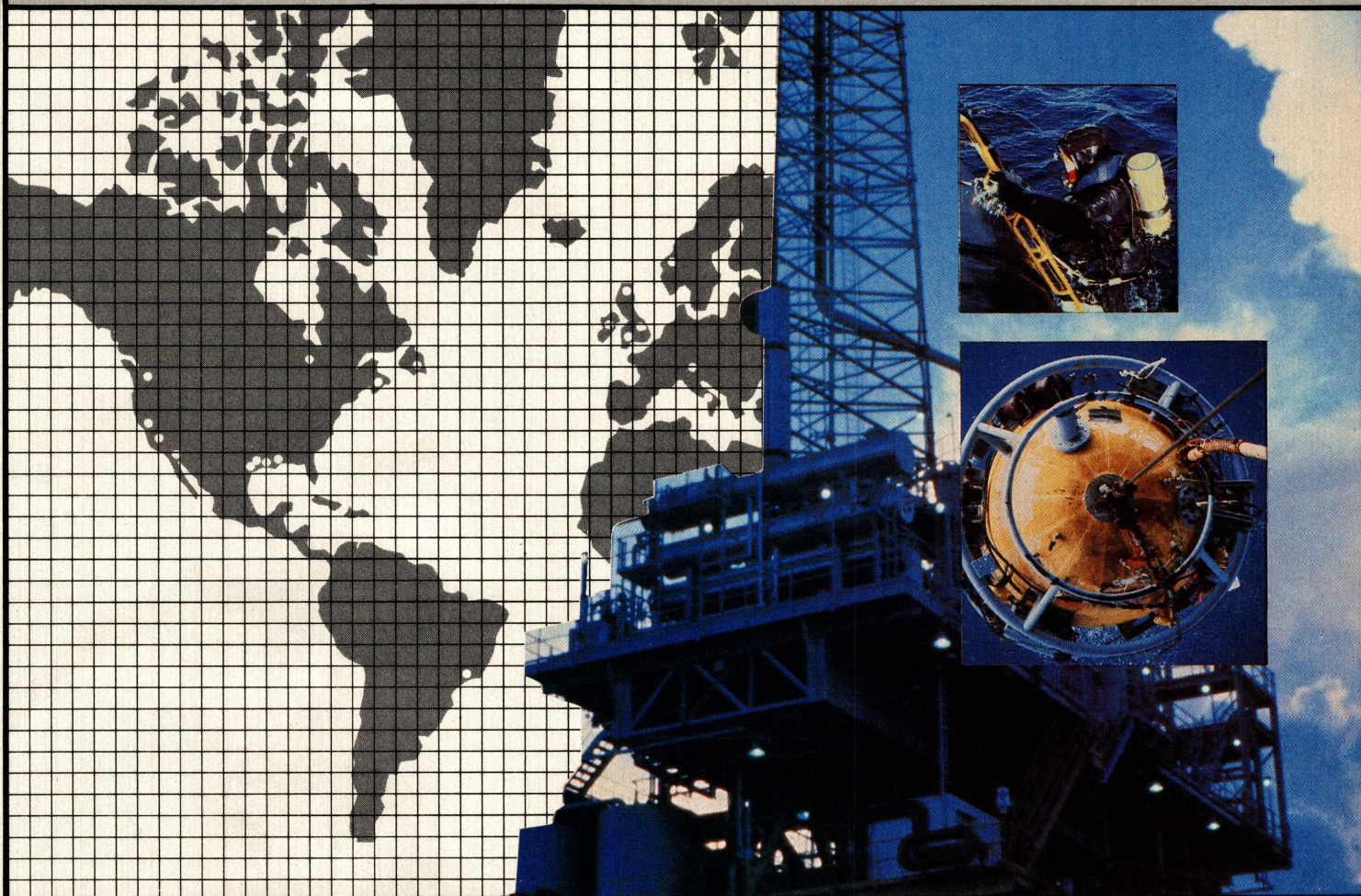
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RX FOR DIVERS

100 feet long, the unwary diver could easily be stung without seeing the animal.

The jellyfish to definitely avoid, however, is the Australian sea wasp. This four tentacled, approximately four inch long animal, is found in swarms, especially at night near the surface of the water along the coast of Australia. If sighted right before a night dive, this author would abort the dive and enjoy the stars and the Milky Way instead. Fifteen to 20 percent of all sea wasp stings are fatal. A dermatitis begins as multiple linear hives which give a whiplash appearance. This can progress to pronounced weakness, swelling of the throat and larynx, shock and death. The severity of the reaction depends on the size of the victim, the number of stings and the particular sensitivity of the person. Full wetsuits are not necessarily protection here, as the sea wasps have been known to get caught in neck openings as the diver ascends. Unless there is a physician on the boat with intravenous corticosteroids or sea wasp antivenin from Australia, this could result in a very unfortunate situation. The Caribbean cousin of the Australian sea wasp is not likely to produce a severe problem.

The mechanism by which these animals (anemones, fire sponges, fire coral, jellyfish and stinging hydroids) injure the victim is the sting capsule or nematocyst. Inside this microscopic structure is a coiled thread fiber with a toxin-containing barb. Upon contact the thread is uncoiled and ejected from the capsule into the skin. The best local treatment of these stings involves: 1) not rubbing the affected area, 2) avoiding fresh water on these areas as this activates the nematocysts, 3) marinating the area with meat tenderizer. This powder contains papain, which dissolves the nematocysts, giving almost immediate relief. Every dive bag should be stocked with a bottle.

Mollusks are usually no problem except for cone shells. Some are highly prized by collectors but with a 20 percent fatality rate if stung—don't touch. The same goes for the blue-ringed octopus of Australia. Twenty-five percent of these bites are fatal. All other species of octopus are safe although they can bite with their sharp, (but small) parrot-like jaws.

The typical coral cut (not fire coral) results from a slightly different mechanism. In addition to nematocysts, the skin is usually lacerated by the exoskeleton of the coral. A delayed foreign body reaction can occur if the debris is not removed and secondary infection sets in. The local skin treatment here should include: 1) again meat tenderizer—papain 2) scrubbing the cut with soap and water with a soft brush or rough towel to remove the exoskeleton 3) applying hydro-

COMING NEXT MONTH IN SKIN DIVER JUNE ISSUE

WRECK FACTS

Readers ask for information on the Great Lakes and our writer provides the inside track—names and addresses of organizations that can help. Need a good reference book on Great Lakes shipwrecks? That's in here, too.

POINT LOBOS

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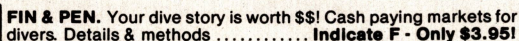
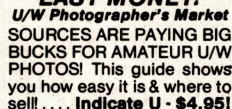
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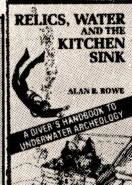
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(Continued on Page 24)

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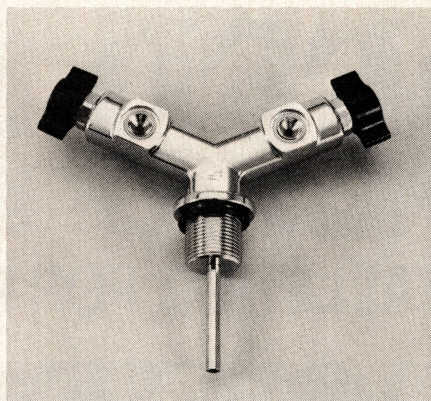
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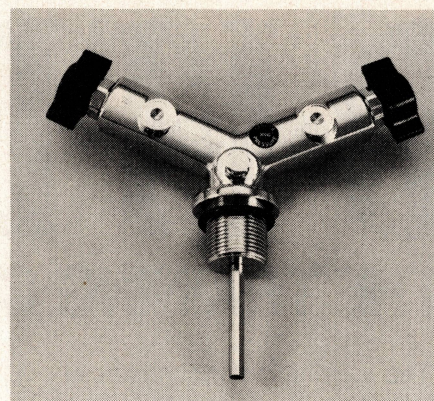
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Sherwood Selpac's SLINGSHOT

BY BONNIE J. CARDONE



Front



Back

Chances are you've never seen a valve such as the one pictured on this page. Although similar valves are available in Europe, the Sherwood Selpac Slingshot (SVB 4240) is the only one of its kind on the American market. It's not new, however, it's been around for about three years.

The Slingshot was designed to fill a demand by cave and wreck divers for a redundant regulator system that didn't take up much space. The Slingshot suits this demand ideally. A single tank can accommodate two complete regulators: two first stages, two pressure gauges and up to four second stages (two primary and two octopuses).

The Slingshot is perfect for comparing a known regulator system performance to an unknown. George Cozens, SDM's technical editor, relies upon a Slingshot when he's testing regulators. On one side of the valve he attaches his own personal regulator, on the other, the test regulator. He can breathe from one, then the other and the differences or similarities are immediately apparent. The Slingshot could also be used to compare a pressure gauge of proven accuracy to one with unknown accuracy.

Cave and wreck divers like the Slingshot because they can carry two complete regulator systems compactly. It would be perfect for ice divers as well.

The Slingshot could also be used on a safety tank hung from a boat at 10 feet: One tank could serve as a decompression or safety stop for four people!

Triple chrome plated brass, the Slingshot has a service pressure of 3000 psi. It can be filled from either side and, either side can be used for the attachment of just one regulator. If the O-rings look different, it's because they are. According to John Canna, Sherwood Selpac's product manager, these polyurethane O-rings are tougher and more tear resistant.

The Slingshot sells for \$75 at your local Sherwood Selpac dealer. For more information write: 120 Church Street, Lockport, NY 14094. 

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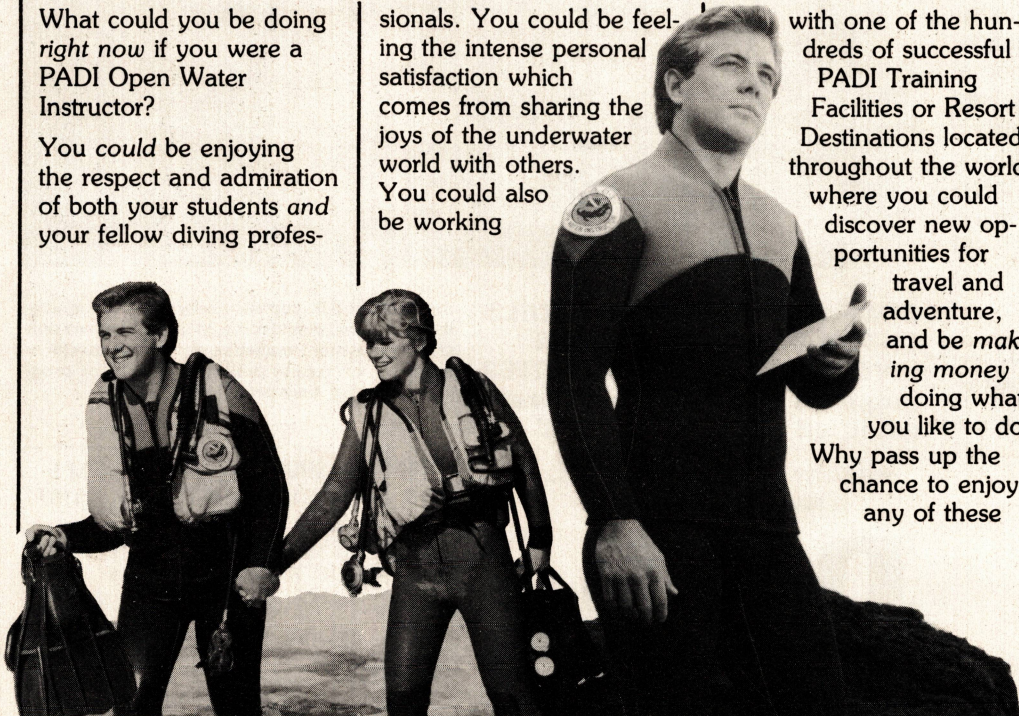
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(Continued from Page 20)

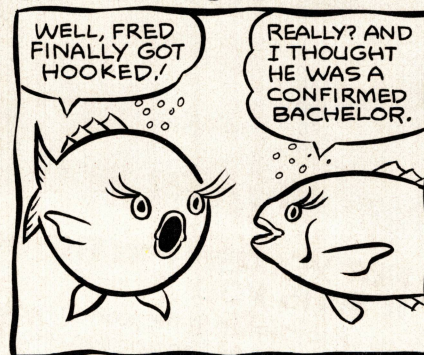
can ruin a vacation, so avoid it. Use a sunscreen with sun protection factor (SPF) of 15, especially one which is relatively waterproof.

If you have overindulged, aspirin (two tablets every four hours) is the treatment of choice. A rare condition called cold urticaria (hives) in which the person gets hives and sometimes breathing difficulties, confusion and rarely shock when exposed to cold air or water, should make cold water diving completely off limits.

And, a final word on the most prevalent skin problem on most exotic remote dive locations—flea bites. The less inhabited and developed an island is, usually the better its diving, and definitely the greater its flea population. These almost invisible creatures go by various euphemisms on different islands but "flying teeth" is a common term. If you have heard that your particular destination might be infested, then: 1) Request a room without rugs—fleas live in them. 2) Bring at least one flea bomb with you and bomb the hotel room immediately upon arrival before you settle in. Repeat in a few days if you are still bothered by them. 3) Use Avon's Skin So Soft bath oil as an insect repellent. It works better than anything else. If the buggers still get you, over-the-counter antihistamines and steroid creams usually suffice.

So use a little common sense and make your dive vacations the safe and fun filled times they are meant to be.

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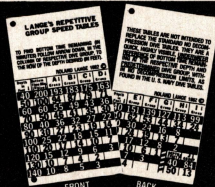


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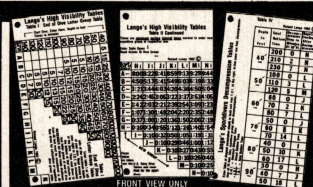


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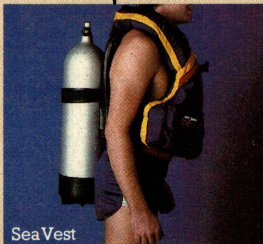
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TWO REASONS WE ROSE TO THE TOP.



(SEAJACKET IV AND SEA VEST)

Technifacts

BY E.R. CROSS



The basic purpose of this column is to stimulate an interest in the technical aspects of diving and dive safety. It will be devoted to providing factual answers to questions from SKIN DIVER readers. Answers will be designed to apply to the majority of dive situations, problems and equipment in use in today's diving.

Last month Technifacts discussed safety in regard to scuba cylinders, with particular emphasis on corrosion problems. This month's column will cover cylinder safety, recommendations for care, maintenance, tests and inspections. We will also provide suggestions for getting the maximum safe use from both steel and aluminum cylinders. For the questions and comments used in this month's column I would like to thank Larry Le May, Houston, TX; C.R. O'Conner, Hyde Park, MA; J.T. Diller, Tampa, FL; and John Grant, Honolulu, HI.

Statistics regarding the number of dive cylinders in use compared with the number of cylinder failures indicate there is a very insignificant probability of a diver ever having to face the problem of a failure of any kind, even a hydro test reject. This is owing to two major causes. First, the manufacturers are doing an excellent job of producing both aluminum and steel dive tanks. A careful selection of metals, compounded into alloys resistant to corrosion, is probably the most important aspect of long cylinder life. The manufacturing and finishing processes also contribute to long life and safety of cylinders. And, divers have learned to take care of their tanks.

The expected life of a steel compressed gas cylinder is estimated to be at least 50 years, longer if the tank has excellent care and preventive maintenance. Aluminum cylinders, under the same con-

ditions of use and care, will last longer than this. Cylinders used by divers in salt water and not properly cared for may last only a fraction of that time.

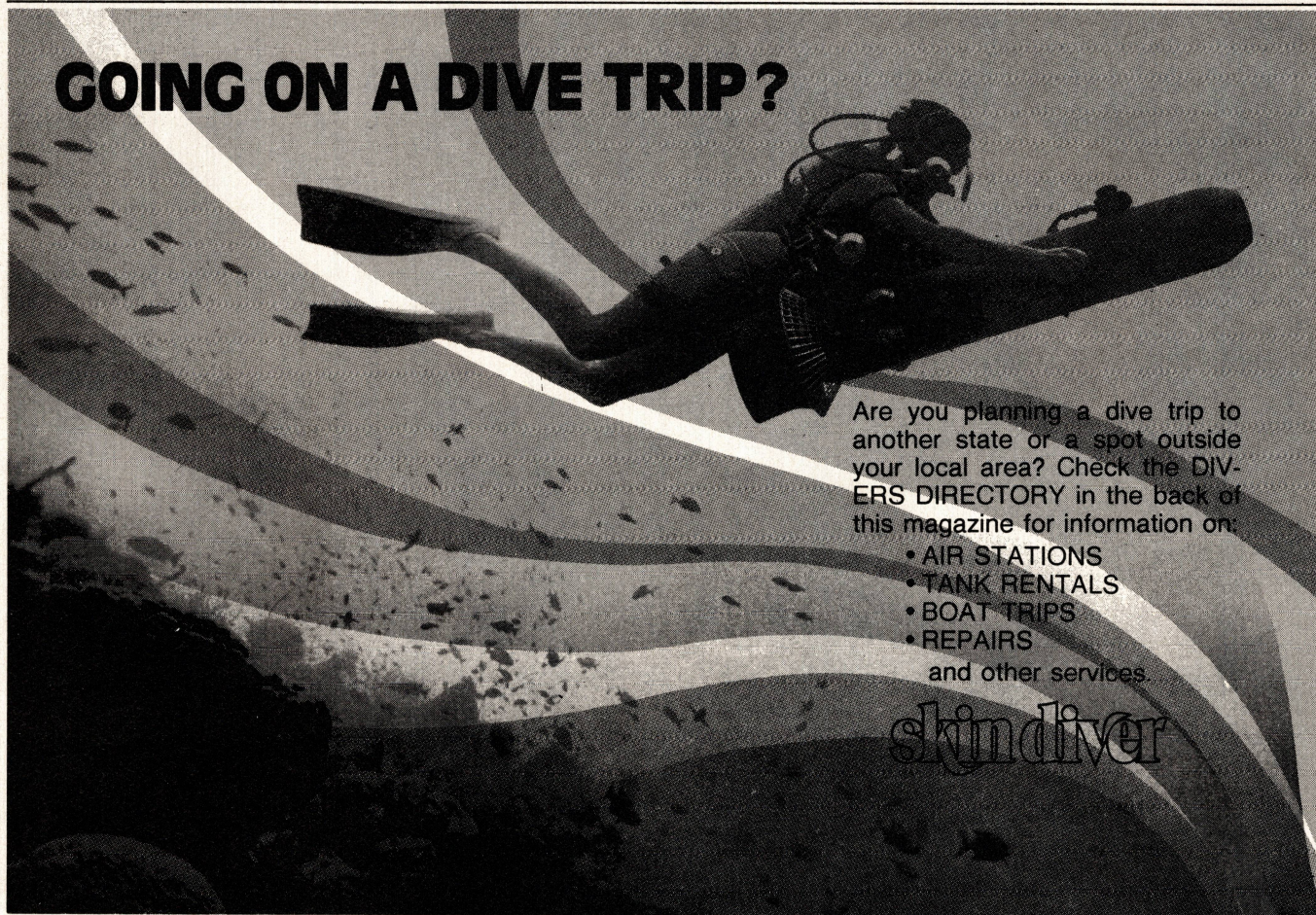
CARE OF STEEL CYLINDERS

A steel cylinder can become hazardous to a diver's health as a result of both external and internal, but usually internal, corrosion. Several steps can be taken to either prevent or minimize this. These steps have been outlined in three publications that will be listed here later. In general, all the publications agree and their recommendations are:

(1) If for any reason, a tank is completely emptied while underwater, remove the valve and check for water inside. If there is water present, rinse with fresh water and blow the tank dry.

(2) Store in a vertical position. Investigators feel that since the tank is thickest

GOING ON A DIVE TRIP?



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- AIR STATIONS
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skindiver

at the ends, there is less chance of corrosion failure when it is stored upright.

(3) Do not store a full dive cylinder for long periods of time. But, some air should be left in the tank. Recommendations vary from 50 to 100 psi.

(4) Dive tanks should not be stored in an excessively hot room or compartment. If stored completely full for even a short time, an increase in temperature might cause the air in the tank to expand and thus raise internal pressure to the point that the safety disk would blow with a safe but bothersome commotion and the necessity for a new disk and a new fill. Also, over a long period, if corrosion is present it will progress at a more rapid rate at increased temperatures.

(5) At this time, and as a result of several studies, it seems that an annual visual internal inspection (VIP) is warranted. It appears to Technifacts that this solves no problems nor does it make the tank any safer basically. However, since DOT prescribed hydro testing is required only every five years, hazardous pitting or other corrosion might be found with a VIP. The one thing this does is find loose corrosion products in the tank that might find their way into the diver's regulator—more on this later.

(6) For all commercial scuba divers and for sport divers who do not treat their tanks with care, five years is too long be-

tween DOT hydrostatic tests. Such a test is not designed to find the tiny pinhole leaks that are very infrequently missed: It is designed to eliminate cylinders whose walls have lost their elasticity, are thinned by corrosion and do not return to near normal volume when hydro pressure is released. Also, the hydro test might find a tank that is ready to explode on filling. The U.S. Navy and New Zealand divers hydro test tanks on a three year basis. Knowledgeable commercial divers make careful inspections of both internal and external corrosion in their tanks and will have a hydro test when conditions appear to warrant it regardless of time since the last hydro. External corrosion and deep gouges or scratches can weaken a tank and are indicative that a hydro test should be made.

(7) Be aware of the condition of your dive tank, both externally and internally. Carefully check the outside of your tank for deep scratches, dings or dents that might affect its integrity. Check for water inside by letting a small amount of air escape very slowly. If the air is dry and the tank free of rust, the air should be invisible and free of odors. Hold the tank close to your ear, tip gently from one end down to the other. Listen for the slosh of water or the sound of rust sliding along the inside. If the air is not clear or if you hear sounds in the tank, take it to a qualified

dive shop for a VIP and possibly a hydro.

CARE OF ALUMINUM CYLINDERS

Basic care of aluminum cylinders is the same as for steel cylinders. Do not abuse the metal or the fittings and the tank will outlast your dive years.

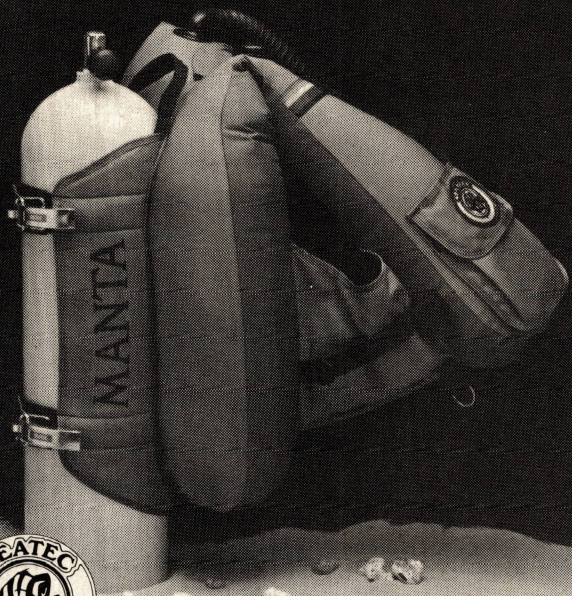
With reference to having a VIP of an aluminum cylinder, here is a quote from a letter of a Technifacts reader, "Other problems than just corrosion are noted during VIP's. The following have been found in aluminum tanks at various times: bad odor, metal shavings, carbon dust from a compressor's activated charcoal and one and one-half cups of yellow-green water. All except the odor can foul regulators and odor, if severe, can cause headaches. These conditions are admittedly rare but all owners involved were glad the VIP was done."

Specific care items are:

(1) Recommended storage for aluminum cylinders is, first choice, on the side and, second, upright; never upside down. The tank should be blocked or supported so it cannot roll or fall.

(2) If an aluminum tank is to be stored for a long period of time, leave only a small amount of air in it, or none if stored in a cool dry place. This is not as critical as it is for steel cylinders but it appears to be a good idea.

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(301) 255-4330</p> <p>* Sea Colony Dive Shop
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(301) 255-4330</p> <p>MASSACHUSETTS
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(601) 544-4170</p> <p>MISSOURI
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TECHNIFACTS

(3) Whenever practical, store an aluminum cylinder empty with the valve loosened. This prevents galling of the threads on the valve and the neck, one of the most common kinds of major maintenance problems in aluminum tanks.

Note: The world gall means "to seize," or "to bind or fasten together." If the galling is bad, almost nothing short of destroying the valve and the neck of the tank will separate the two.

(4) Periodically, certainly on an annual basis, have a dive shop remove the valve and recoat the valve stem threads and tank neck threads with an approved lubricant. Allow at least three hours from time of application to insertion of the valve in the tank since little is understood about the effect of the lubricant and the high partial pressures of oxygen in a scuba tank. Odors from a freshly applied lubricant may be nauseous to a diver, particularly during a dive.

Evidence in all the reports studied shows the above suggestions to be as important for the care of aluminum tanks as they are for steel tanks. As pointed out in last month's Technifacts, certain trace elements can cause more serious problems in aluminum cylinders, fluorene, for instance. Another element aluminum is sensitive to, from the standpoint of corrosion, is copper. There are possibly other elements to which aluminum is sensitive and divers should use caution in the internal cleaning of their aluminum tanks. Steam cleaning with hot air drying is probably the best and safest method. As stated last month, Technifacts does not believe the tumbling of aluminum tanks is indicated under any conditions.

Some U.S. Navy aluminum tanks suffered serious corrosion a few years ago. It should be noted that those cylinders were made of a different aluminum alloy than is presently used. The alloy now used, designated 6351-T6, is believed to be considerably more stable than that used in early Navy tanks.

For the diver who wants to know about corrosion and tanks, it is suggested the following publications be studied:

(1) *Scuba Tanks, High Pressure Cylinders for Diving*. Bob Gonsett; National Association of Underwater Instructors. Probably available through your local NAUI representative.

(2) *Corrosion Studies of Steel Scuba Cylinders*, Scuba Safety Series Report No. 1. Department of Ocean Engineering, University of Rhode Island. Primary investigator, Lieut. Richard Peyser, U.S.C.G.

(3) *Corrosion of Steel and Aluminum Scuba Tanks*. Francis C. Cichy, Hilbert Schenck, and John McAniff. University of Rhode Island.

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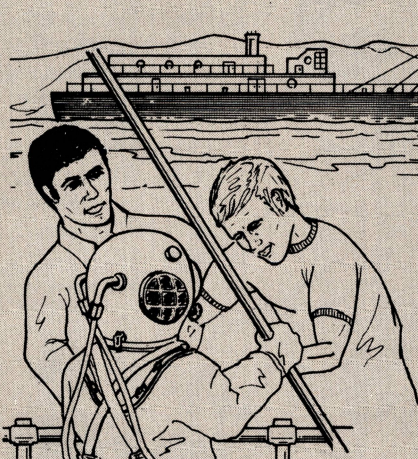
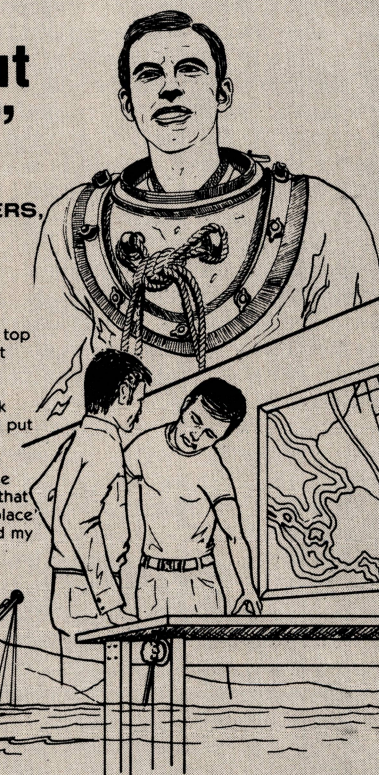
says graduate Gary Emerson
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TECHNIFACTS

(4) *Marine Corrosion*. Francis L. LaQue; John Wiley and Sons, New York. This is a good book on the why and how of corrosion in general but never gets specifically into scuba tanks or dive-related corrosion. It points out very bluntly that anything will corrode in the environment of salt water and high concentrations of oxygen found in dive cylinders.

Technifacts next month will review correspondence received from SKIN DIVER readers who knew divers and others involved with the *Squalus* disaster and the rescue of the men trapped in the cold Atlantic in 1939. (See Deep Rescue, SKIN DIVER December, 1982.) Some interesting letters have been received.

SC SHIPWRECKS

A nine month project to compile information about shipwrecks within South Carolina or adjacent waters has begun at the College of Charleston. The project, supported in part by a grant from the South Carolina Committee for the Humanities, an agent of the National Endowment for the Humanities, is divided into three parts.

First, an inventory of available historical and archaeological data on shipwrecks will be compiled. Data on Savannah, GA wrecks will be included. Next, the overall importance of the wrecks will be evaluated and a comprehensive report prepared. The third part of the project will involve a series of public displays and lectures across the state.

Persons having shipwreck information which they are willing to share with the public are asked to contact: Shipwreck Project, Special Collections, The Library, College of Charleston, 66 George Street, Charleston, SC 29424. All persons contributing information to the project will be acknowledged in the final published report. Announcements concerning time and place of displays and lectures will be made at a later date.

WASHINGTON STATE AWARDS

At the recent Washington State Sport Diving Council Annual Awards Banquet, two significant awards of recognition were made:

President's Award—Stan McNutt, city manager of Des Moines, for his successful efforts in establishing new, underwater marine parks.

Diver of the Year Award—Bob Goddard, president of Tropical Adventures Travel and past president of the State Diving Council, for his efforts in promoting participation of sport diving.



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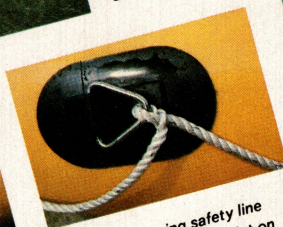
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HIGHEST SCUBA DIVE

Charles F. Brush, Ph.D., leader of the Brush High-Altitude Andean Expedition, sponsored by Yale University's Peabody Museum and the Explorers Club, and his four co-members trekked to volcano Licancabur, in November 1982, where they made 11 record breaking scuba dives in the crater lake. Licancabur is on the Chile-Bolivia border, and its lake (19,455 feet) is the highest body of water in the world. The previous highest scuba dive was in the crater lake of Nevada de Toluca, at 15,016 feet, in Mexico.

After breaking ice in the lake for more than an hour, Dr. Brush made the first dive using open circuit scuba with a regulator specially modified for pure oxygen. Subsequently he and his expedition co-members made ten additional dives; these were over three-quarters of a mile higher than any previous dives.

An astounding concentration of plankton was found in the lake; samples are now being analyzed at Yale's Peabody Museum. It will take some time to determine whether these are new species, but this is likely. The crater lake is a self-contained ecological system for no plant or animal life exists on the volcano for several thousand feet below the lake.

Archeologist Brush, 59 year old climber, marathon race-walker and three term former president of the Explorers Club, was joined on the expedition by Rob Blatherwick, Dr. Robert Mende, Scot Pearlman, and Dr. Johan Reinhard.

TRASH FESTIVAL

The Beauregard Divers Association of De Rider, LA will hold its Third Annual Trash Festival at J&L Marina on Toledo Bend Lake, May 28-29.

First, second and third place trophies will be awarded in each class of competition. These will be: most cans collected, most combined weight, and most unusual object brought up. A trophy will be given to the club with the most divers entered (Beauregard Divers not eligible).

Activities will include a crawfish boil, live band, beauty queen contest and sexy legs contest.

J&L Marina has a full restaurant, game room, cabins, boat rental, boat launch, 300 foot water slide, Jet Skis and a complete dive shop on the premises.

Divers and non-divers are invited to join in the festivities. For information contact: Darrell Forney, Rt. 1 Box 319, Leesville, LA 71446; (318) 239-7585.

FLORIDA KEYS

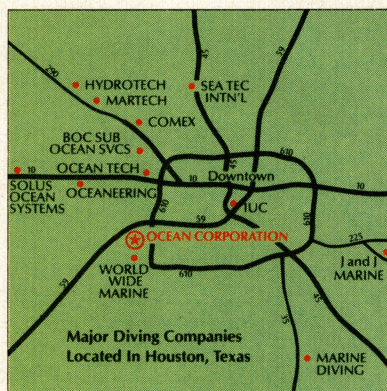
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BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

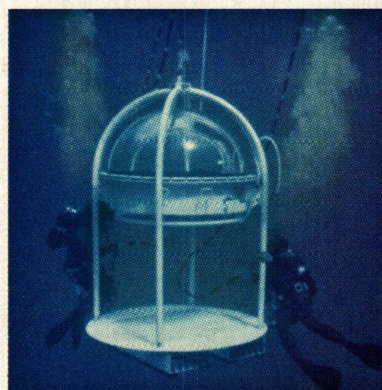
The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size

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The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean



Corporation, Larry Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.

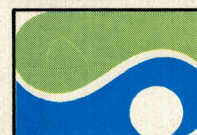


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NAUI/FIT REFRESH

The National Association of Underwater Instructors, South Atlantic Branch, in cooperation with Florida Institute of Technology, will host a diver refresher course on June 4 on the Florida Institute of Technology Jensen Beach Campus. More than a dozen experienced NAUI instructors will contribute to workshops on topics such as accident management, underwater photography, repetitive diving, wreck diving and others.

Basic divers and instructors alike will benefit from these information-packed seminars. There will be an opportunity to make a dive in commercial gear, surface supplied equipment and a deep recompression chamber dive.

For information contact Tom Ingram, NAUI South Atlantic Program Coordinator, Florida Institute of Technology, 1707 N.E. Indian River Drive, Jensen Beach, Florida 33457. ✖

NO HANDICAP

PADI International College of San Diego, California recently presented PADI international open water certification credentials to Traudel "Trudy" Koller. She is a native of West Germany.

Prior to coming to the college, Koller,

who travels extensively, had dived many resort areas of the world in addition to Austria's Lakes. She is an avid underwater movie photographer and impressed the staff of the college with her demonstrated expertise in the water. Her deafness is no handicap to her diving.

The PADI International College's student body has a relatively large segment of foreign students, representing over 35 countries. These students can depend on special attention to problems that may occur because of differences in methods or procedures in their country. ✖

UNDERWATER HOCKEY

The Underwater Hockey Nationals for 1983 will be hosted by the CenCal Council over the Memorial Day Weekend, May 28-30 in San Francisco, CA's Treasure Island Naval Base pool.

The pool is large, and play will be conducted across the deep end (12 feet) with spectator viewing (in the water) and video viewing by a poolside monitor.

For more information, contact CenCal Hockey Director, Guy Chambers at 6442 Colby St., Oakland, CA 94603 or CenCal Council, Carol Rose president, 849 W. Orange Ave. #1002, S. San Francisco, CA 94080; (415) 583-8492. ✖

ARKANSAS U/W HUNT

Many divers dream of finding sunken

treasure and many divers fulfill that desire each year during the Underwater Treasure Hunt at Lake Ouachita in Hot Springs, Arkansas. Sunday, June 12 will mark the date of the fifth anniversary of this popular event.

Fifty "sunken treasure ships" will be hidden, containing numbers corresponding to 50 prizes to be given away, including the grand prize Caribbean dive vacation. Prizes totaling more than \$2,500 will be awarded, making this the biggest hunt to date.

For more information call or write: The Arkansas Divers Association, 4701 J.F.K. Blvd., North Little Rock, Arkansas 72116; (501) 753-6060, (501) 753-6004. ✖

NAUI PDC COURSES

The NAUI Professional Development Center of California is offering a full schedule of diving instructor and diver training courses for the 1983 school year. The Professional Development Center has expanded its offerings to include many new, innovative classes designed to enhance the learning and skills of its students. Each class is limited in size and operates in a setting designed to maximize the potential of the enrollee.

For information contact Curt Pihl, Director of Student Services, 1706 N. Tustin Ave., Orange, CA 92655; (714) 998-6362. ✖

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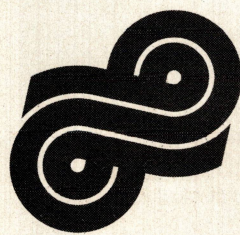
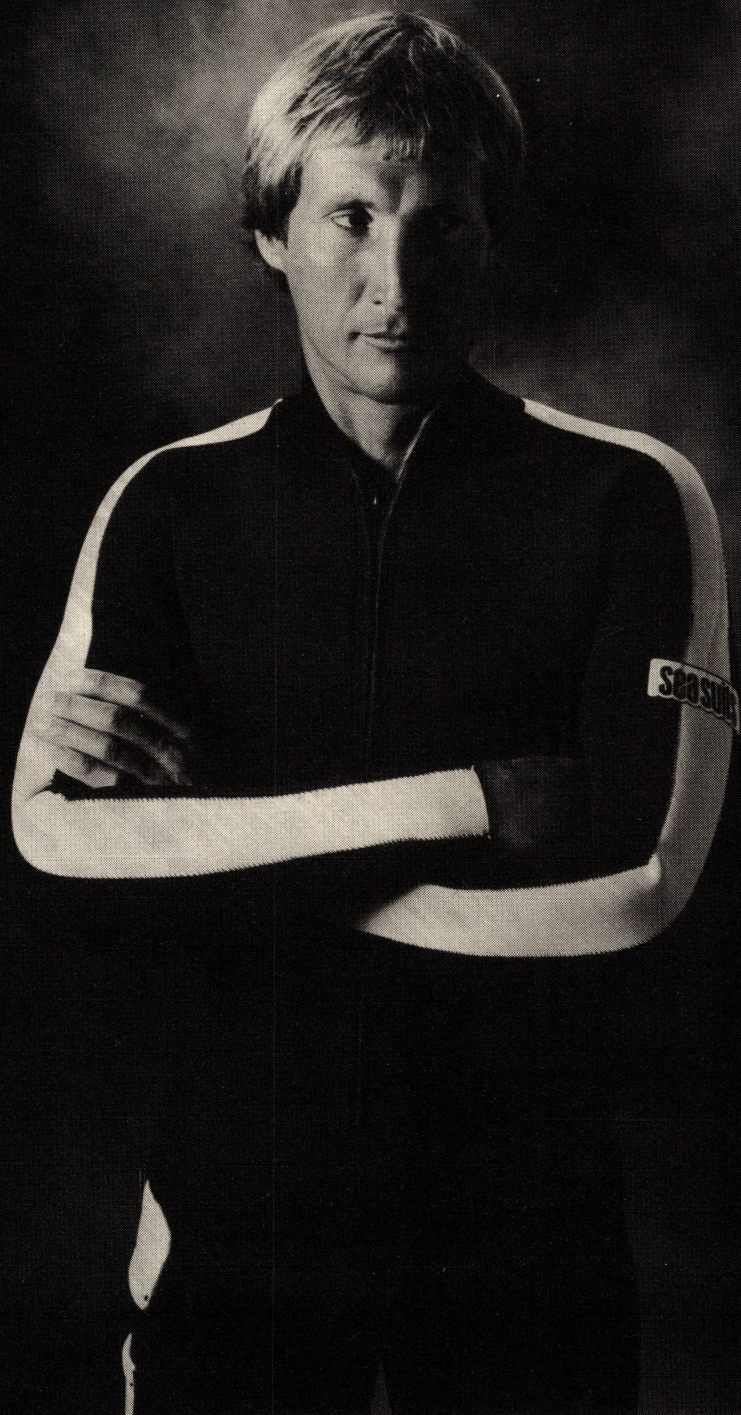
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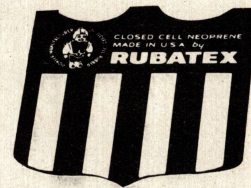
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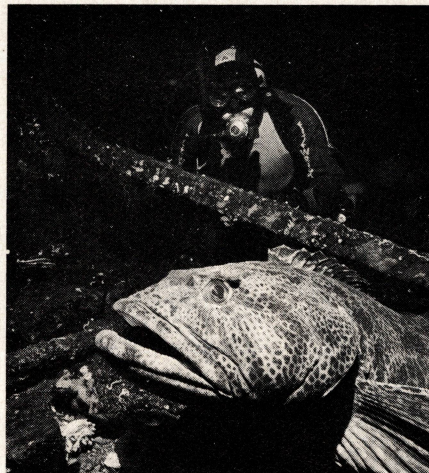
The waters of British Columbia host a great number of shipwrecks, ranging from proud, three masted sailing vessels dating back to the 1800's, to modern cargo ships such as the *Vanlene* which ran aground on the west coast of Vancouver Island in 1972. Many of the wrecks are relatively intact owing to their location in fairly deep water, well removed from the destructive effects of the open ocean. Only recently, several large wrecks have been found and there are still many more which lie in their graves as yet undiscovered and undisturbed.

In 1910, the 120 foot coastal freighter *Capilano* ran into a reef, suffering extensive damage. In her crippled condition she limped into Blubber Bay on the northern end of Texada Island, just east of today's popular dive resort area of Powell River. Repairs on the *Capilano* were hastily made by the crew with the help of local island residents. But, once again outside the protection of the bay, she was caught in the open by a southwesterly gale. The patchwork repairs were torn apart, leaving the *Capilano* to founder on a shallow reef. She managed to hang on the reef just long enough for the crew to be rescued and finally settled on a deeper reef near Vivian Island in 125 feet of water.

Clues to the ship's location surfaced when gill nets kept getting caught without explanation. In June of 1981 the exact lo-

British Columbia Shipwrecks

intact plus havens
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BY STEVE ROSENBERG

cation was discovered by a chance depth finder reading. Today the *Capilano's* location is kept in relative secrecy by professional underwater photographers, Jim Willoughby and George Rumley. It is their hope to preserve the wreck exactly as it was found by securing park status.

Finding the wreck on any given day appears to require a combination of modern science and a few magical incantations. With my dive buddy Bill Baker and I looking on in fascination, George Rumley zeroed in on the approximate location by lining up landmarks miles away. In heavy downpours and thick fog the landmarks would be obscured, making it nearly impossible to locate the wreck without much more sophisticated equipment. As we watched the depth finder outline the hull structure of the *Capilano*, Jim tossed a lead "cannonball" sinker into the water to anchor a large buoy. We later found that the marker had hit almost the exact center of the ship. Making a few more passes, George lined up the positioning of the wreck, and announced he had dropped our anchor just aft amidships.

Leaving George on the boat, Jim, Bill and I slipped into our drysuits. After double checking lights, buckles, inflator hoses and strobe connectors, we stepped comfortably into the 45°F water. We paused at the surface only long enough to review our dive plan and check the ex-

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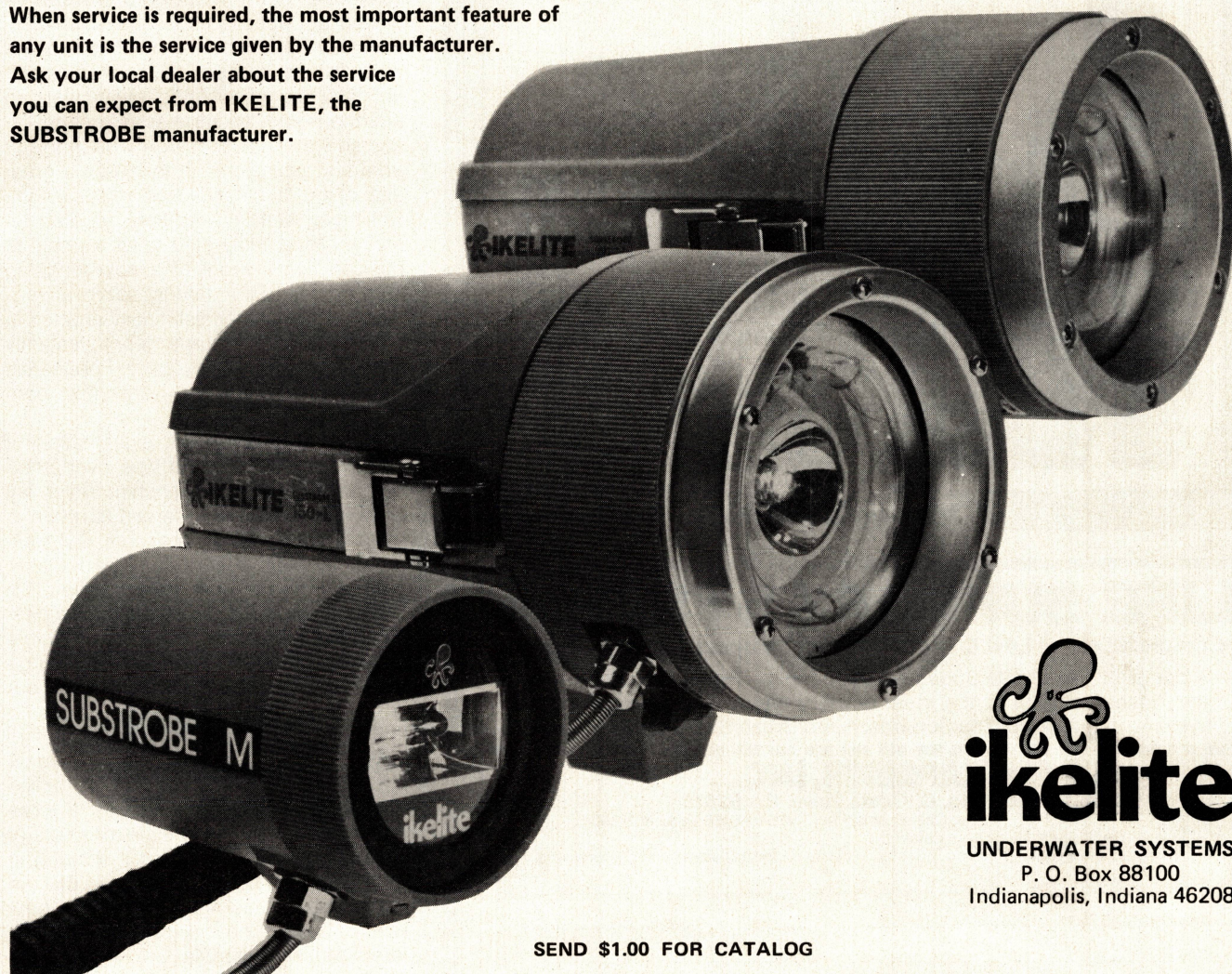
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CAPILANO WRECK

tra tank that would be left hanging at ten feet in case of emergency. We descended slowly along the anchor chain into the darkness below. At 60 feet the outline of the wreck began to take shape, and at 75 feet the cloud of haziness caused by a recent plankton bloom suddenly broke. Directly below us we could see the stern of the freighter quite distinctly.

The steel deck, which was cluttered with debris, was broken by two gaping rectangular access holes which led to the hold of the ship. Lining the holes, and scattered liberally over most exposed surfaces was a profusion of large white *Metridium* anemones. Even while we were some 30 feet above the top of the wreck we could see the forms of massive 70 to 80 pound lingcod resting on the deck below us.

Jim patiently posed beside one monster ling after another, each of which measured in excess of four feet in length. He later told us stories of encountering lingcod whose heads filled the full width of hatchways, and of others which had gone after overcurious divers, munching drysuits into wetsuits.

At one point we found ourselves poised at opposite ends of a small passageway leading between sections of the hold. Parked between us, with no apparent intention of cruising away was an enormous ling. An impressive array of razor sharp teeth protruded far enough from his gaping mouth to reflect a great deal of the illumination from my dive light. Not being familiar with their reputed ferocity, I repeatedly tried to lift his chin to position him in front of a now laughing Willoughby. After taking several moments of abuse, the fish finally erupted in a flurry of sediment and debris, instantly engulfing us in zero visibility. Fortunately it fled down a side exit rather than confronting its harassers.

After making a quick examination of the ship's wheel, which was overturned but intact, and a large anchor, which lay below decks, we were forced to return to the anchor chain for our ascent. Our limited 20 minute bottom time had disappeared all too quickly. As the three of us hung on the chain we laughed and gestured back and forth in the unintelligible language of divers. I imagine that George was listening to the excitement from our bubbles as they burst at the surface.

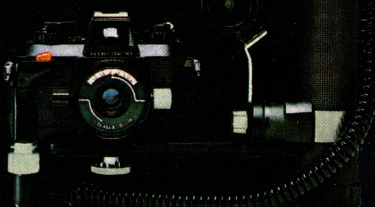
Even as we were motoring back to Powell River, the depth finder (which was always kept running) sketched the outline of what looked very much like a three masted schooner. With the excitement of the dive on the *Capilano* still echoing in our minds, we suddenly realized that we might have discovered another new wreck. Such is the thrill of diving the waters of British Columbia, where a new adventure is only a dive away. 

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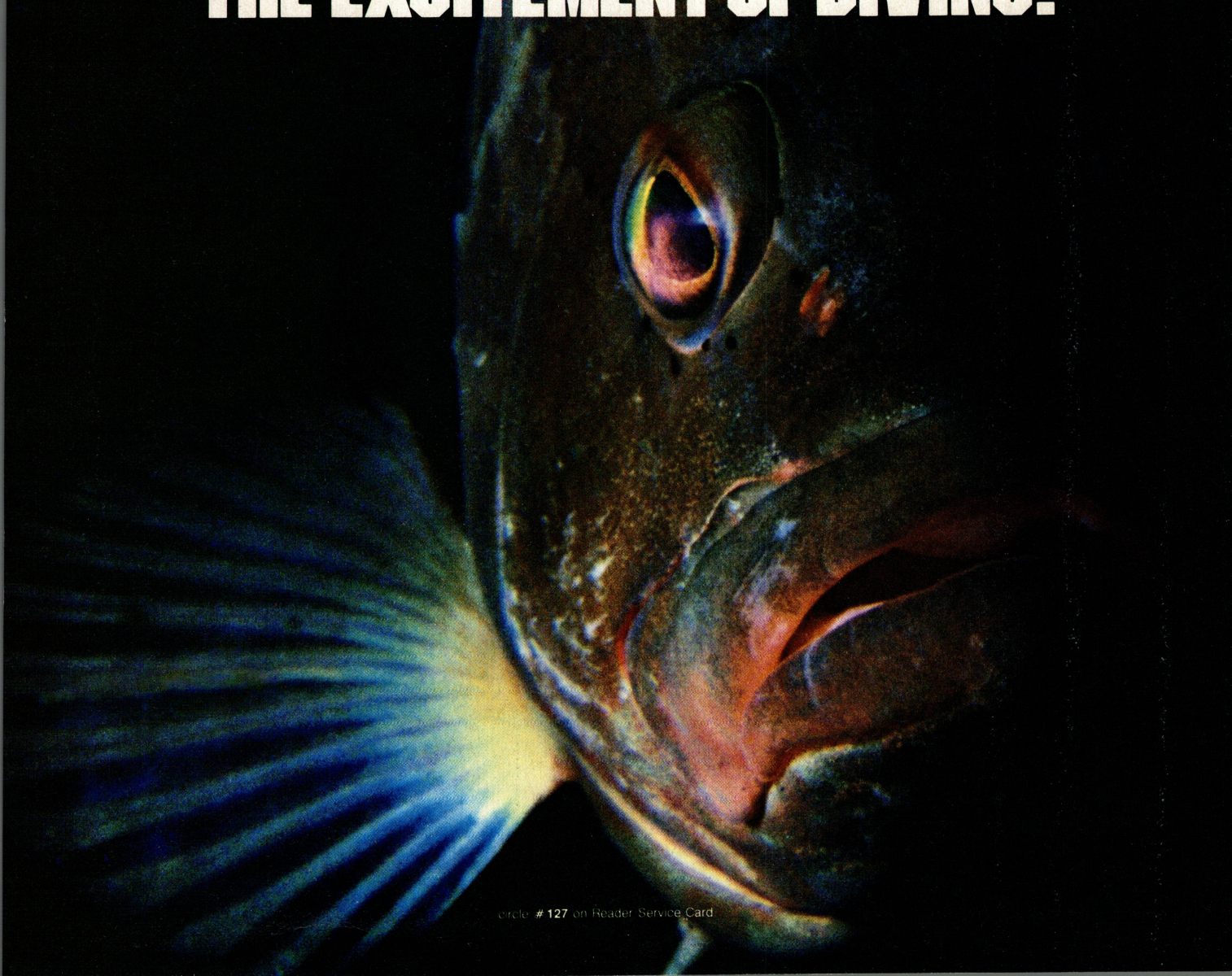


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Repetitive Dive Calculations

According To The U.S. Navy Tables

BY BONNIE J. CARDONE

You've heard the old saying, "Use it or lose it," dozens of times. Well, it certainly holds true when it comes to the repetitive dive tables. Don't use them for awhile and they become a confusing maze of meaningless numbers. Or, try to work a set unfamiliar to you with no false starts or wrong turns. Is there a solution? Yes! Get out your set of tables and let's review some basics.

Although several organizations print and distribute dive tables, all of these are the U.S. Navy Tables. They may have been rearranged or color coded to make them easier to read and use, but basically they are the tables you learned to work in certification class. If you look at any of them long enough they'll begin to look familiar. Some tables, however, do have additional information not found on the

Navy tables in the form of Adjusted No Decompression Limits. These are arrived at by subtracting Residual Nitrogen Times from the No Decompression Limits. Having this done for you saves time and eliminates possible errors.

There are four tables used by sport divers. We will focus on three of them: The No Decompression Limits and Repetitive Group Designation Table for No Decompression Air Dives; the Surface Interval Table; and the Residual Nitrogen Times Table. Each is fairly simple in itself, it's only when they're altogether that they look intimidating.

The first table has the longest name: The No Decompression Limits and Repetitive Group Designation Table for No Decompression Air Dives. To make things easier here we'll refer to it as Table

1. It contains the depths from 10 or 40 feet to 140 or 190 feet in five and ten foot increments. It also lists the no decompression limits for each depth and letters of the alphabet that represent your group designation after a dive. These letters range from A to N, O or Z. Group A is the one with the least Residual Nitrogen Time; Z represents the group with the most. (Some tables do not list groups O or Z because it is felt that sport divers should never find themselves in such high residual nitrogen groups.) Using Table 1 is easy: Find your depth, read to your bottom time, then read toward your group designation letter.

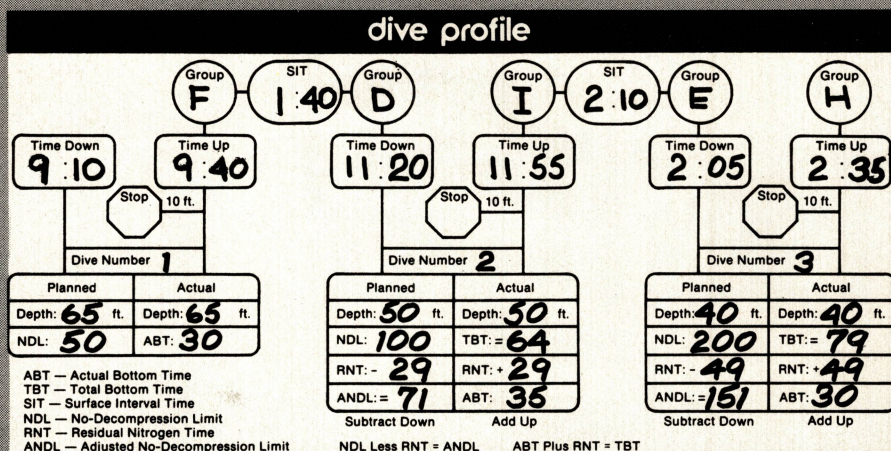
Table 2 is the Surface Interval Table. It consists of the group designation letters divided by boxes containing surface interval times. This is the least complicated

table but one of the most confusing to use: Divers forget whether they are supposed to read up, down, across or what. You can end your confusion by noting, *before* you start to work a problem, the direction in which the times increase. The first time given in each consecutive box increases from the last time given by one minute. Thus, if you find yourself staring at a time identical to the last one in the box you just left, or a time that has decreased or a time that has increased by more than one minute, you have gone the wrong way—back up and try again! The other area of potential confusion is the manner in which the times are listed; hours: minutes. Thus, 59 minutes is listed as 0:59 while 60 minutes is shown as 1:00 (one hour: no minutes). You must convert all surface interval times into hours: minutes to use this table. Times on Tables 1 and 3, however, are given in minutes only. If your surface interval is less than ten minutes add the two bottom times together and treat them as a single dive to the deeper depth.

Enter Table 2 at your group designation letter from Table 1. Read the proper direction to your Surface Interval Time. From there make a 90 degree turn toward the other set of letters. These represent group designation after surface interval and indicate that body tissues have gotten rid of some nitrogen.

You have now progressed to Table 3: The Residual Nitrogen Times Table. It contains the group designation letters on one side and the repetitive dive depths on the other. In between are numbers representing Residual Nitrogen Times and, on some tables, Adjusted No decompression Limits. We've mentioned Residual Nitrogen Times before but let's define them. This is the time, in minutes, that a diver must consider he/she has already spent on the bottom when making a repetitive dive. It is also referred to as penalty time. Residual Nitrogen Time (RNT) is added to Actual Bottom Time (ABT) on a repetitive dive to arrive at Total Bottom Time (TBT). TBT must not exceed the no decompression limits for that depth. The Adjusted No Decompression Limits (ANDL) listed on some tables are No Decompression Limits minus RNT.

Now that we've reviewed the three tables and their uses let's review some basics about repetitive diving. The U.S. Navy developed the tables we use for young, male Navy divers in top physical condition. Every certification agency urges divers not to push the tables. Exactly what does this mean? Simply that you should use them conservatively and avoid extremes. Decrease your bottom time by five or ten minutes and increase your surface interval instead of running these right up to the allowable limits. And, if you are a woman; not so young; out of shape; working hard; or diving in cold water, use the next greater depth, the



Repetitive dive calculations can become confusing if you don't practice them often. Use the dive profile above to work the problems in the article and refresh your skills.

next greater time, or both, when figuring your group designations. On a second or third dive, when figuring your ANDL, use the RNT for the next *lesser* depth. A study of your tables will show you that the shallower the dive, the more RNT is assigned to it for each group designation.

The Repet Tables have a 12 hour base. Any dives made within a 12 hour period are considered repetitive dives. Also, every dive is considered a decompression dive: On no decompression dives your ascent is your decompression. This is why you are told to ascend no faster than one foot per second and are advised to follow your slowest rising bubbles. You also make your deepest dive first because of this principle. Progressively shallower dives allow the body to outgas instead of taking in progressively larger quantities of nitrogen.

You begin timing your dive when you begin your descent from the surface. Bottom time ends when you begin your ascent from the bottom. You can add a small safety margin by timing your dive from surface to surface.

It is easier to keep track of your dive profile if you have some sort of worksheet. The Dive Profile reproduced here is found on the back of Jeppesen Sanderson's newly revised dive tables. These cost \$1.25 each and are sold at stores that use the Jeppesen Sanderson system. They are printed on a unique, waterproof paper that is practically indestructible. It can be written on with an ordinary pencil and erased. There is a poster-sized version for instructors and stores for \$2. Study the legend on the Dive Profile and then we'll work through a three dive day.

On a sunny Sunday, four Californians set out in their 21 foot hard hulled boat to dive several reefs off the Palos Verdes Peninsula. The plan is for one buddy team to dive while the other stays on the boat. The teams are Ron and Leslie and Ken and Jim. Both teams will dive each site, but we will profile only Ken and Jim.

The group arrives at the first reef about 8:30 am. At 9:10, Ken and Jim roll off into water the fathometer indicates is 65 feet deep. They are intent upon game and cover a lot of ground in search of scallops. Surfacing 30 minutes later, they climb aboard and Ron and Leslie go over the side.

On the Jeppesen Dive Profile look at Dive Number 1: Time Down, 9:10; depth, 65 feet; NDL, 50 minutes (we must use the NDL for 70 feet). Our divers are actually down 30 minutes at 65 feet and they surfaced at 9:40 (Time Up). After this dive they are in group F. They relax aboard the boat while Ron and Leslie are diving, then the boat is moved to a new spot. By the time they are ready to dive again, it is 11:20 and their Surface Interval Time has been one hour:40 minutes (1:40); they are group D divers. The second dive will be in 50 feet of water. Our divers compute their ANDL for 50 feet by subtracting their RNT of 29 minutes from the NDL of 100 minutes. Thus, they have 71 minutes of bottom time (ANDL). Ken and Jim are actually down for 35 minutes, surfacing at 11:55. On the Dive Profile we work from the bottom up to get 64 minutes of Total Bottom Time. On your tables you should find that divers with this kind of bottom time at 50 feet are in group I.

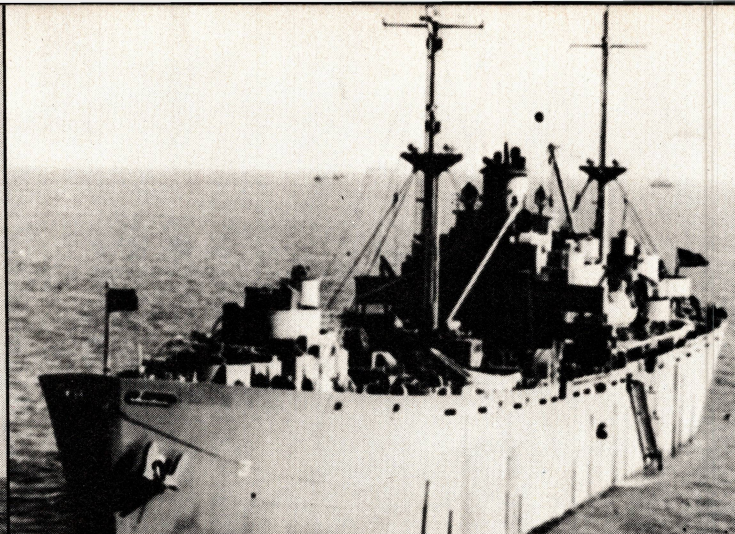
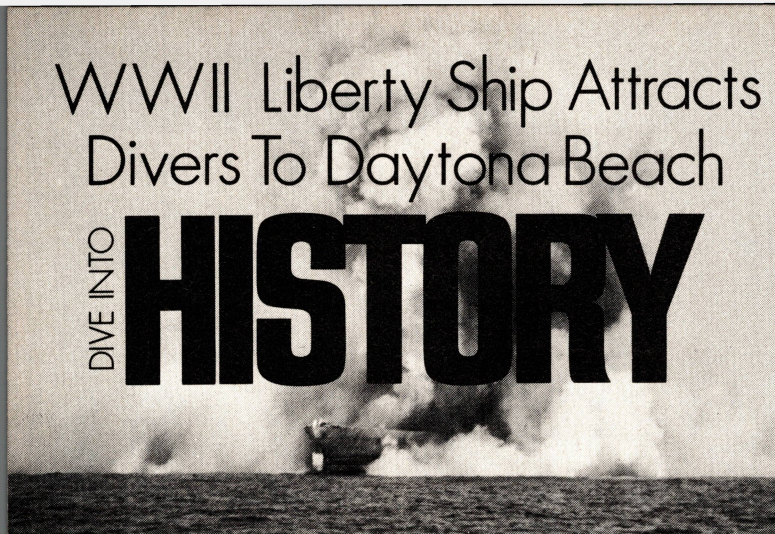
The second surface interval for Ken and Jim lasts for two hours and ten minutes (2:10). They have a leisurely lunch, move the boat and prepare for the last dive. When they enter the water they are group E divers. Since the NDL for 40 feet is 200 minutes and E divers have an RNT of 49 minutes, Ken and Jim have 151 minutes of ANDL time left, more than enough for this third, single tank dive. They are actually down for 30 minutes. Thus, when they surface, they have 79 minutes of TBT and are group H divers.

Now that you've refreshed your memory, turn to Dennis Graver's Scuba Quiz and see how well you do on it. The Quiz has additional information on repetitive diving not in this article. Good luck!

WWII Liberty Ship Attracts Divers To Daytona Beach

DIVE INTO

HISTORY



photo/Don Serbousek

BY BILL BARADA

The U.S.S. *Mindanao*, one of the largest of the World War II Liberty Class ships, was born in Baltimore on May 20, 1943 at the Bethlehem, Fairfield Shipyard. She died on October 11, 1980 as the result of a massive explosion that was deliberately set to send her to the bottom as an artificial reef. The 441 foot hulk lies in 85 feet of water on the bottom of the Atlantic about eight miles offshore Daytona Beach in Volusia County, Florida.

The *Minnie* as she was affectionately nicknamed by her crew, not only served through an exciting period of U.S. history during World War II but continues to

make history. Today she is a different kind of artificial reef that serves as a fascinating underwater playground for sport divers as well as a bonanza for rod and reel fishermen. Two dive clubs, the Ormond Anchor Chasers and the Daytona Beach Skindivers, were participants in the program that could set an example for other reef building projects around the nation. The *Mindanao* was originally christened the *Elbert Hubbard* in honor of an Illinois journalist. The Navy changed this to *Mindanao* in honor of a tough little gunboat that was lost in the battle of Corregidor. The new *Mindanao* sailed for Cu-

ba, then through the Panama Canal to Noumea, New Caledonia where she joined the Pacific Fleet which was assembling for an attack on the Philippines.

She was equipped as a repair ship and served as "mother hen" to fighting ships by keeping them repaired and in fighting trim. Her skipper, Commander G.B. Evans, was loved by her officers and crew and the *Minnie* was known as a happy ship throughout the backwaters of the South Pacific. Crew members claim that the ship's brig was never used except for the storage of beach party equipment.

The *Mindanao* continued service in the

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DIVE INTO HISTORY

Solomons, Okinawa and Shanghai until she was returned to San Pedro, California in March, 1946. She was decommissioned in May, 1947 to join the Reserve Fleet, then sent to the St. James, Virginia mothball river fleet until she was turned over to Florida by the Maritime Commission to become an artificial reef.

What makes the *Minnie* different from other artificial reefs is that, not only is her official history available from Navy records, but dive club members have accumulated a fascinating personal history from former crew members who wrote to newspapers as a result of the *Mindanao* story. Don Serbousek, president of the Ormond Anchor Chasers, reports that divers began corresponding with the *Mindanao* crew members and as the idea caught on, more and more names were added and letters were soon flying back and forth all over the world. The crew members were sent tapes and asked to record their adventures and experiences and to send back photos for inclusion in a book. The divers say that Navy men are a terrific source of information. The dive club received a microfilm copy of the

Mindanao's daily log book as well as some great stories and photographs. The pictures were copied and the originals returned, but reproductions can be made from the negatives. The local library and civic officials are interested in utilizing the Anchor Chaser's record of the *Mindanao* story and one of the fondest hopes of the dive club is that some day a reunion can be arranged with the *Minnie's* former crew members.

Another major difference between the *Mindanao* and other wrecks is that the *Minnie* is relatively intact. This is unusual because even ships sunk as artificial reefs are usually so thoroughly stripped and gutted that about all that remains is an outer shell.

Florida's artificial reef program was successful in obtaining five Liberty ships for use as artificial reefs. But, all of these were sunk in the Gulf of Mexico in the vicinity of St. Petersburg, and all of them were stripped and gutted so they resemble huge, open underwater stadiums. These ships are a boon to rod and reel fishermen, but divers looking for a shipwreck to explore find these no more attractive than a good, fish-producing natural reef.

This is not true for the *Mindanao*, which was Florida's sixth Liberty ship. It was obtained by the Halifax Sportfishing Club of

Daytona Beach on condition that it be placed in the Atlantic off Volusia County and with the stipulation that the ship would be part of a marine science study program built around the county's planned artificial reef system. As a result, the *Minnie* not only serves as home for an amazing concentration of marine life, it is also a marvelous shipwreck for scuba divers to explore.

The site selected for the *Mindanao* was an unproductive sandy bottom 10.6 miles north of the Ponce de Leon Inlet and about eight miles directly offshore. The ship was towed into position and sent to the bottom by Navy demolition experts. She went down in three minutes and hit the bottom with pinpoint accuracy at exactly the right location. The ship also hit stern-first, so the hulk would remain upright in the furrow plowed by the stern and not tilt to one side. This was essential. Had it tilted on its side in 85 feet of water, its width would have made it an obstruction to surface craft.

The hulk is 441 feet long and 81 feet wide. It sits upright on the bottom so divers have no trouble remaining oriented to the ship's position while exploring the interior. The superstructure and top two decks were removed to cut the height to 35 feet in order to provide the required 50 foot navigational clearance.

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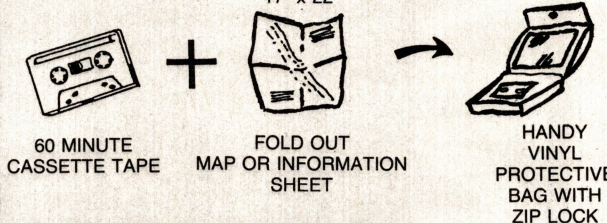
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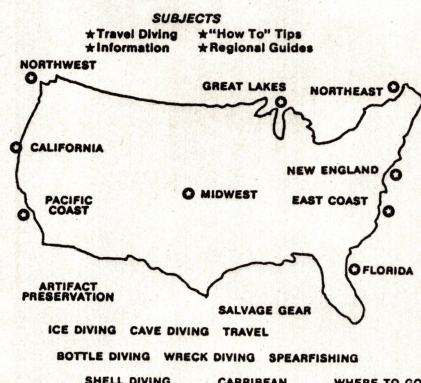
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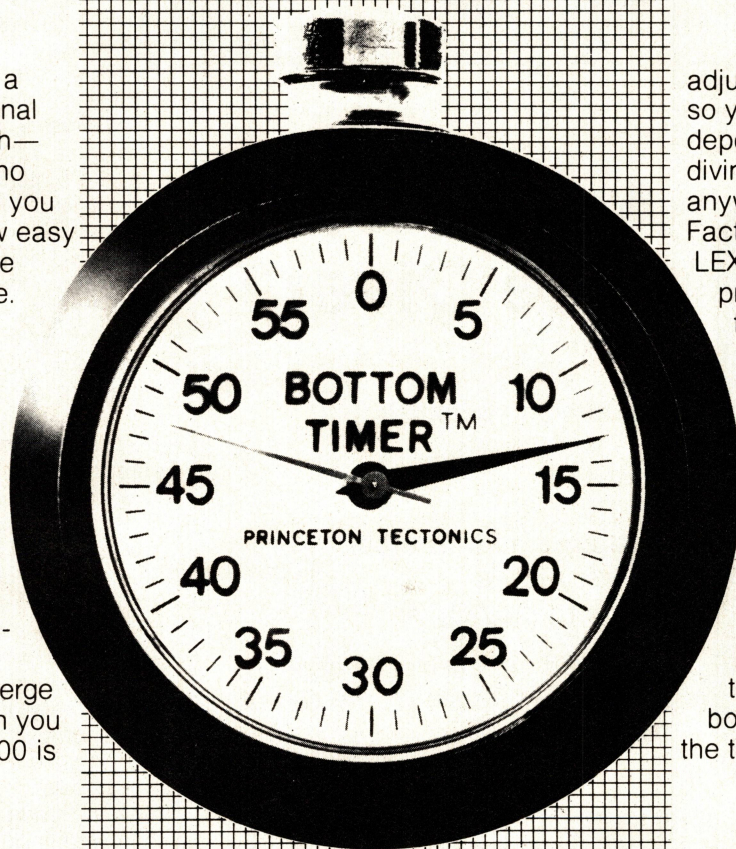
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DIVE INTO HISTORY

Three decks remain as do the bridge, engine room, power plant, boiler, steam generator and a 70 foot long drive shaft that is 14 inches in diameter. The compartment housing the drive shaft is large enough to swim through, so a diver can enter this from the engine room and swim all the way to the stern. Most bulkheads are still in place and a maze of compartments exist in all three decks. Large, jagged holes have been blasted between the compartments and from each compartment to the outside of the hull. These holes were designed to give fish and other marine life free access to all parts of the ship's interior, but the same holes are large enough to permit divers to swim in and out without fear of getting trapped. Thus, divers can enter the ship at the bow and explore each of the four levels all the way to the stern. Adding to the *Minnie's* appearance of an authentic shipwreck are a large, cast iron control wheel and a maze of more than 50 brass valves that are still intact and in place.

There is little doubt that artificial reefs attract and concentrate fish. An example is Elliot Key, Florida where fish populations doubled just two and one-half years after a tire reef was built. Also, the fantastic concentration of fishes and marine life around ships sunk as artificial reefs off Palm Beach and in the Gulf of Mexico are a living testimony to the effectiveness of these structures as fish attractors. But, unfortunately, there is little scientific data to support claims that artificial reefs actually increase fish productivity and overall fish populations. Although many of the reefs in Florida have been financed by local communities there has been little or no feedback or monitoring of their success once they are in place.

But Volusia County's reef builders plan to correct this deficiency. A key provision of the *Mindanao* program was that the site selected for the reef was to be the result of a scientific survey and the location was to be continuously monitored in order to compare results with natural reefs and other artificial reefs. In addition to recording fish population changes, the survey was to monitor such things as water temperature, current speed and direction, salinity, turbidity and light intensity.

The Ormond Anchor Chasers were selected to conduct the surveys. But the sport divers did not have the required experience and Serbousek asked that scientific training be provided to ensure that his club could perform the work properly. The state agreed, but hit a snag when they tried to find the needed instructors. Only one person in the entire state, Dr. Heyward Mathews of St. Petersburg Artificial Reefs Association, was officially certified as competent to make surveys of

(Continued on Page 50)



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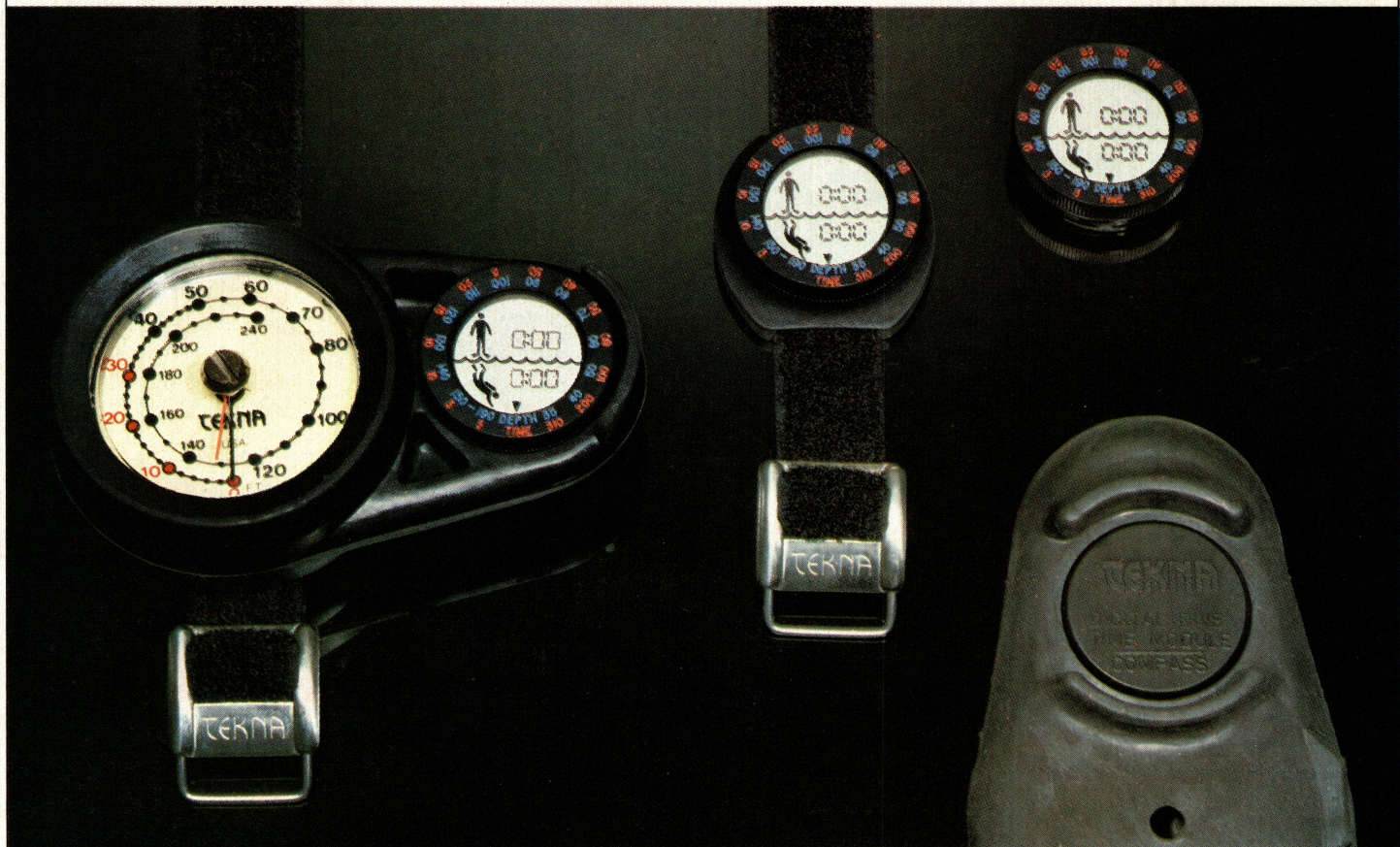
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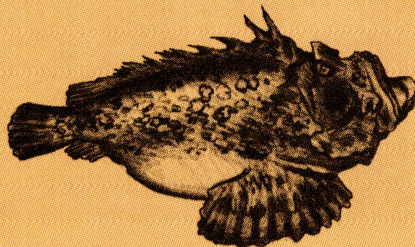
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The Stonefish

(*Synanceja horrida*)

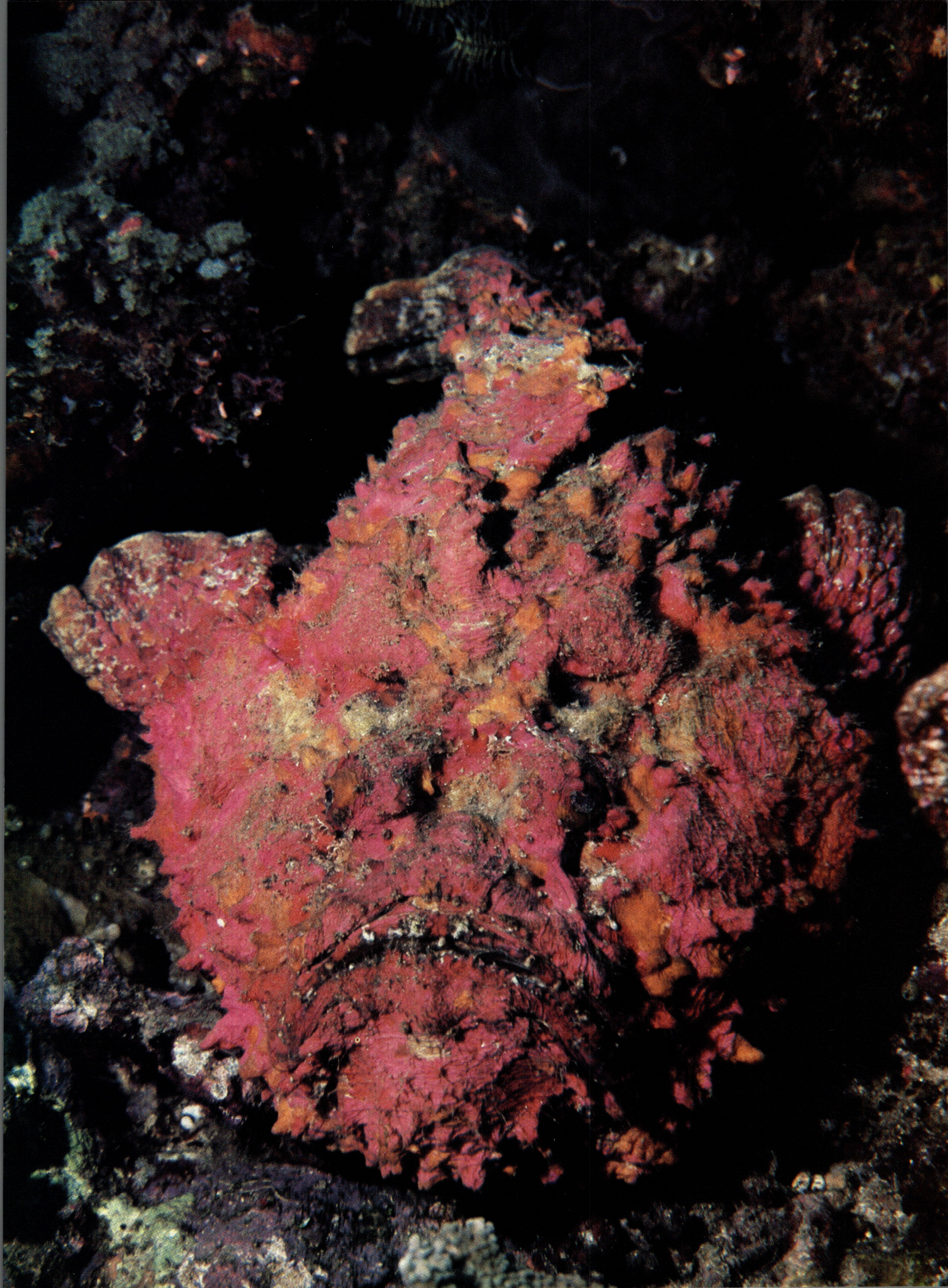
The deadly stonefish is so-called because it looks like a stone—with warts, tentacles, large head and weedy appendages camouflaging it against the rubbled environment it lives in. It can quickly change colors, from a brown above, lighter below, to red. There are irregular blotches of gray on the body and fins, which also help to conceal it. The overall camouflage adds to its lethal nature, because the fishes it feeds upon fail to see it and become easy prey. □ The stonefish can also be deadly to man. The 13 spines on its back have paired venom sacs at their bases (*Synanceja* comes from the Greek meaning “a narrow valley in which streams meet,” and *horrida* means “rough,” or “prickly”). The venom is virulent—extremely poisonous—and there have been authenticated reports of humans dying within an hour after stepping on a stonefish. Government laboratories in Australia have only recently developed an antivenin serum against stonefish punctures. The seriousness of the wound depends upon whether or not the poison reaches a main artery when a mishap occurs. □ The stonefish is a member of the family Scorpaenidae, or scorpionfishes. The word scorpion creates an instant picture of venom and stings, and all scorpionfishes have short, stout spines on the head and strong spines on the dorsal, anal and ventral fins which are venomous. The stonefish is the most venomous of tropical Indo-Pacific scorpionfishes and, because they are so unusual some ich-



thyologists separate stonefishes into an independent family, Synanciidae. □ Scorpionfishes are bottom dwellers, swimming only to make short, quick dashes to capture food or escape to shelter. They are excellent camouflagers, with their blotchy bodies blending into their surroundings almost perfectly. The major characteristic feature of scorpionfishes is the bony plate that extends across the cheek, from beneath the eye to the operculum. This bone is called the suborbital stay, and is the reason scorpionfishes are referred to as mail-cheeked. Usually there are spines extending from this bone, which add to the overall spiky appearance of the fish. □ The stonefish occurs throughout the tropical Indo-Pacific, and off Australia has been recorded from Queensland, plus the Northern Territory and Western Australia. In Queensland it is common on the shallow mud flats and in estuaries, and is also common along the coral reefs of the Great Barrier Reef. The stonefish is a sluggish swimmer and depends upon its camouflage to catch its prey. It will bury itself beneath the sand or mud bottom until only the eyes and mouth are visible, then make a quick forward snap when an unwary fish approaches. A filmed observation was made of a stonefish capturing its prey, and from the snap at approaching food to the return to resting position, only one-sixteenth of a second elapsed. The stonefish grows to a length of 24, although the average maximum size is 10 inches. »

Photo By Carl Roessler-Text By Hillary Hauser

Roessler took the photograph near Madang, New Guinea at a depth of 40 feet. He used a Nikon F camera in a Niko-Mar housing, one Bauer E252 strobe. Shot at f11, 1/16 second with ASA 64 film.



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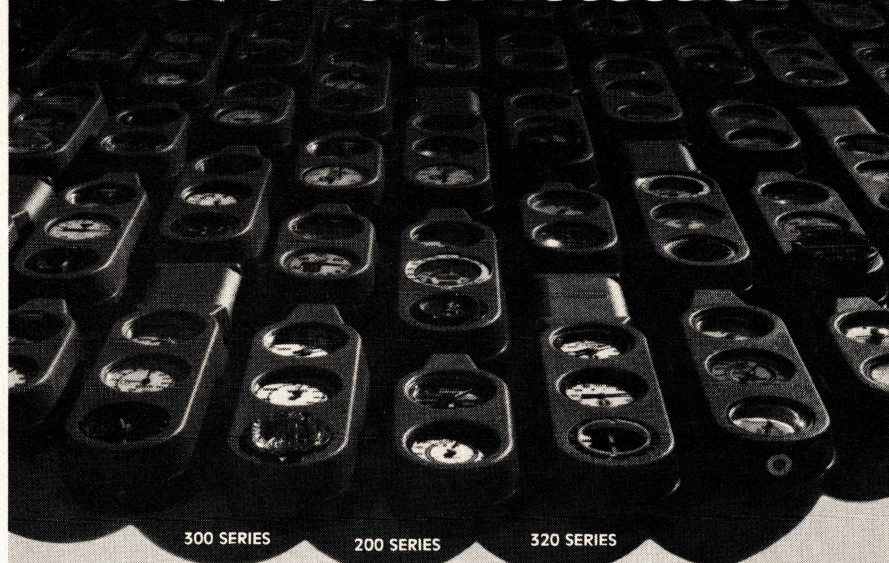
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DIVE INTO HISTORY

(Continued from Page 46)

artificial reef sites. This no doubt explains why five Liberty ships were obtained for this area.

As a result, a formal artificial reef diver training program was established, federal funding was received and scuba divers from all over the state, including university professors and government agency personnel, signed up for a six week course. Graduates of the program received a certificate as an Artificial Reef Research Diver and were certified as instructors capable of teaching others how to make a site survey for an artificial reef. The program is now considered a model for other states to follow.

Although the *Mindanao* was cut to a height of 35 feet, it is still an awesome hulk. It projects above the sandy floor of the Atlantic like a great, battered wall that extends along the bottom of the ocean as far as the eye can see. The *Minnie* will never provide divers with a spectacular view of a hull teeming with tens of thousands of fish of all different sizes and shapes, as do the open hulks of other ships sunk as artificial reefs. The water off Daytona is not clear enough for that, even if the *Minnie's* interior were fully exposed. And, although the wreck has only been down for less than three years some divers have been disappointed in the scarcity of marine life outside the hull. However, these divers admit they have not penetrated or explored the interior compartments, and that's where fish are taking up residence. Peering through one of the jagged openings into a dimly lit compartment reveals a hull so full of fish they obscure your vision. The majority of these are tiny baitfish, but grouper are abundant in sizes up to 30 pounds, and a few black bass, red snapper, sheepshead and amberjack can be spotted. But the greatest abundance of fish, and the most exciting diving, is exploring deep into the ship's interior.

The combination of a maze of compartments and water with limited visibility makes the wreck interior a blackwater dive which the Anchor Chasers say is very similar to a cave dive, and it requires the same safety precautions such as good lights and a safety line. Another hazard rarely found in freshwater caves are the intense currents that sometimes sweep the Atlantic in this area.

Extremely large fish, including jewfish, inhabit this section of the coast and the Anchor Chasers expect the *Minnie* to produce some record breaking catches. The hulk is located outside the three mile limit, in federal waters, so spearfishing is legal.

But for most divers the greatest thrill of diving on the *Mindanao* is that of exploring the interior maze of a relatively intact shipwreck and knowing that you are diving into a piece of America history. 

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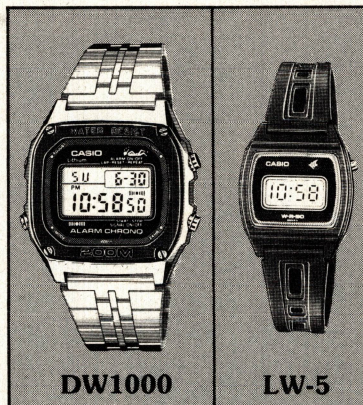
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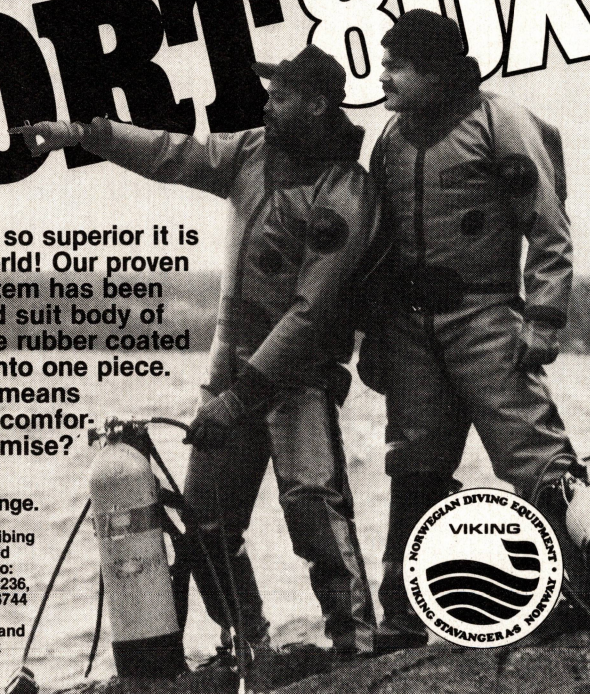
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LOBSTER DIVING

BY ROBERT G. BACHAND

Diving for lobsters—what better reason for braving the cold Massachusetts waters, putting up with the low visibility of southern New England or enduring the bone chilling thermoclines of New Jersey's coastal wrecks. With the quest for these delicious crustaceans, however, comes the responsibility for conserving this rapidly disappearing resource.

Catching lobsters is best done at night when the critters have left their dens in search of food. Shining a narrow beam light just in front of the inquisitive creatures will often prompt them to move toward the light. The diver can then grab them from behind with a free hand, minimizing the chance of damaging them. A light shined directly into the crustaceans' eyes will, however, send them scurrying for safety. If the lobsters are still in their dens, a gloved hand can be thrust into the hole, grabbing a claw, pinning it down, then slowly and gently working up past the two claws. When a firm grip is obtained around the body, the critters can be pulled out of their hiding place. At times, it is helpful to dig out an area under the lobsters in order to free them. Attempting to pull the animals out by a claw(s), the diver more often than not will end up with just the limbs. Lobsters have the ability to voluntarily shed claws. Lobsters should be handled with care for a very obvious reason—large crusher claws can break fingers. Nevertheless, lobsters must be taken by hand since it is illegal to take them by spear, gaff, etc., throughout their range.

States allowing scuba diving for lobsters require that they be measured while still underwater or immediately after emerging from the water. Keepers ordinarily must be a minimum of 3 3/16 inches, measured from the rear of the eye socket along a line parallel to the center line of the body shell (carapace) to its end. Females found carrying eggs must be released. Eggs may not be scrubbed or otherwise removed. Game wardens carry a dye which reveals evidence of eggs forcibly removed. Loss of permit, heavy fines and a jail sentence can be imposed for the scrubbing or taking of undersized lobsters.

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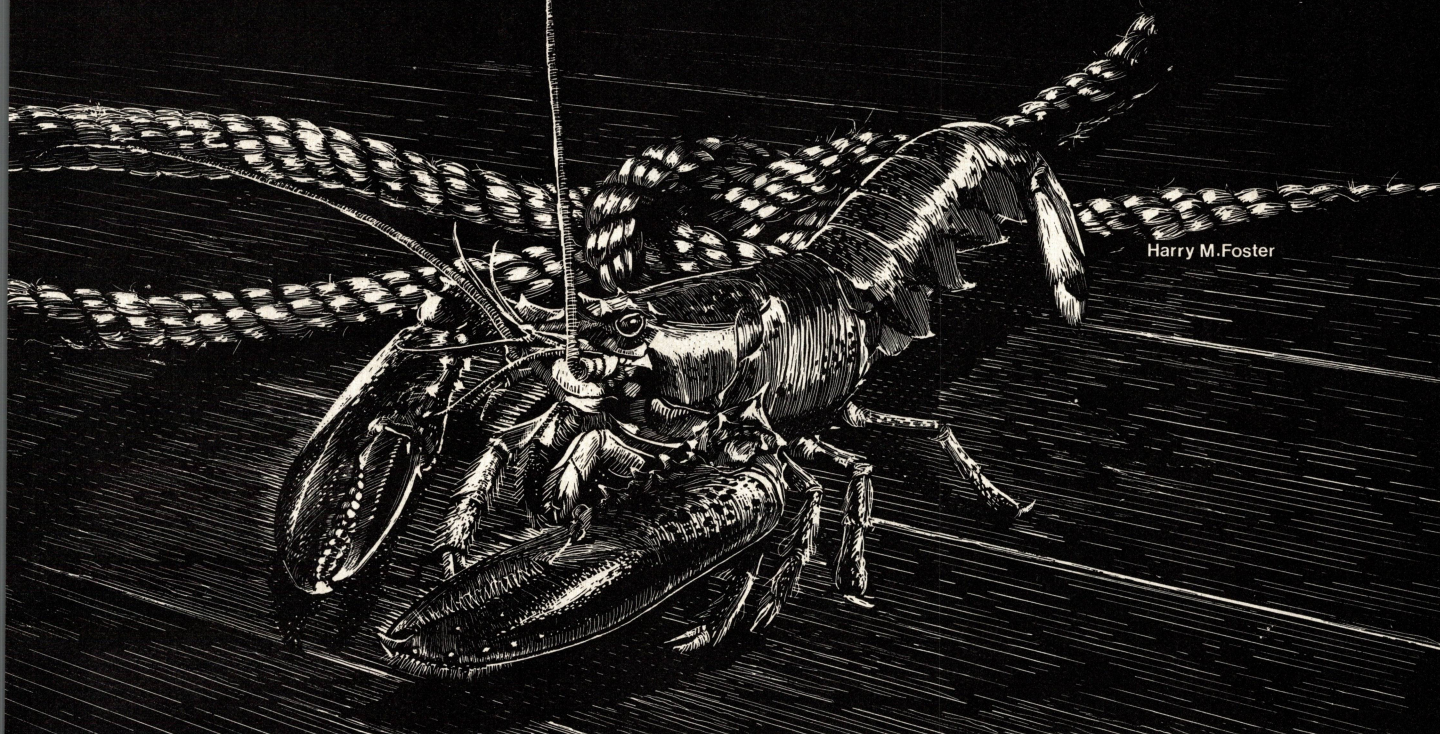
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Newly hatched lobsters (which look like small insects) drift to the upper surface of the water column. They remain there for about a month, depending upon the water temperature. Lobsters carry their supporting skeleton on the outside

of their body, thus they must shed or molt as they grow larger. Through successive molts, the young finally reach what is known as the fourth stage. The tiny animals then sink to the bottom looking very much like an adult. In nature, approxi-

mately 3 of 3000 hatched eggs reach the fourth stage, the rest are consumed by a variety of predators.

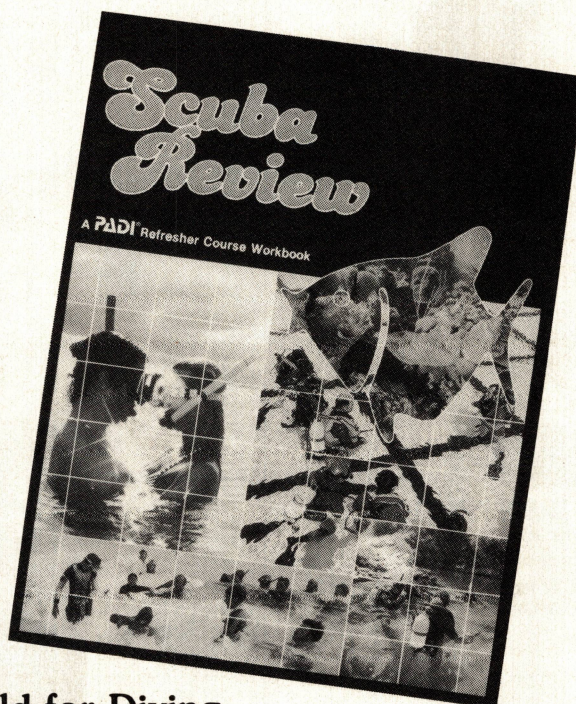
During the first year of life, the animals go through about 10 molts, increasing each time approximately 50 percent in



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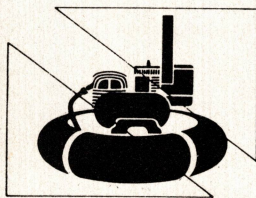
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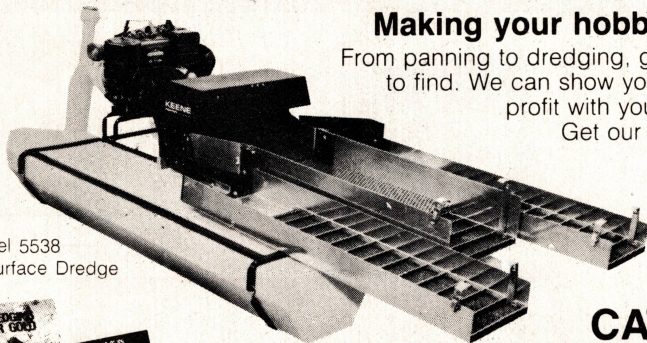
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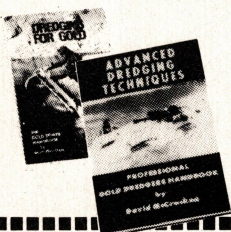
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LOBSTER DIVING

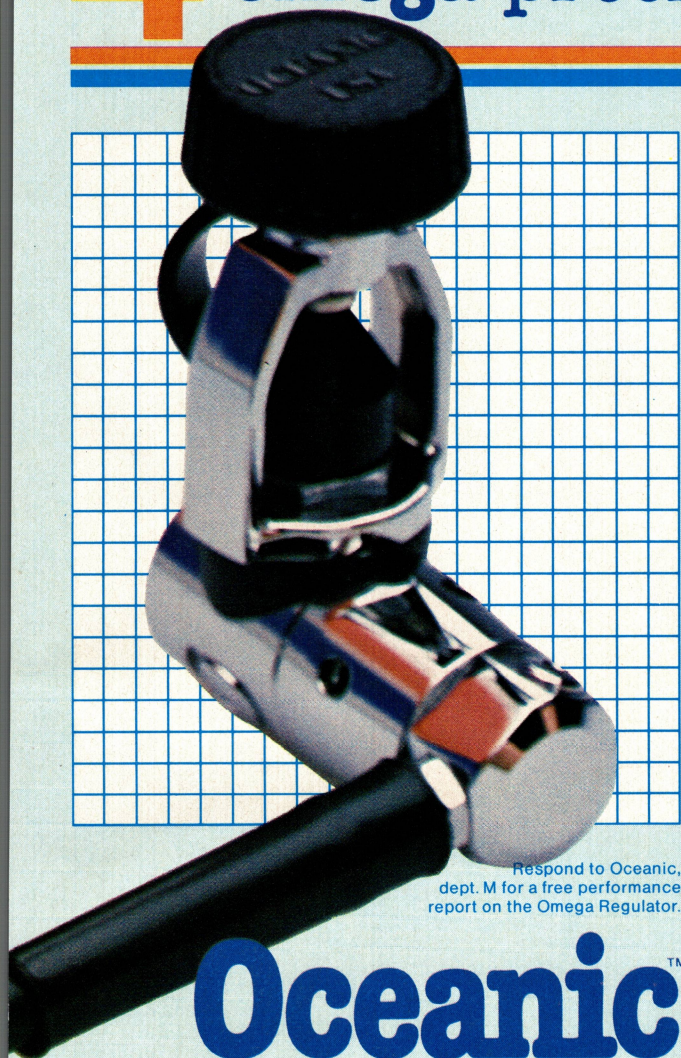
weight and 20 percent in length. It takes seven years for the crustaceans to reach a weight of one pound and a carapace length of 3 3/16 inches. According to John Hughes, director of the Massachusetts State Lobster Hatchery, about 90 percent of lobsters caught inshore have just reached minimum legal size. Less than 10 percent of them have reached sexual maturity. In other words, 90 percent of the lobsters caught have never mated! Not only is this frustrating to the little critters, its implications are also serious for their propagation. Thus, Hughes and many other marine biologists favor increasing the minimum legal size from 3 3/16 inches to 3 1/2 inches. States have thus far not been able to pass such a law. Legislators feel that because of difficulties which would arise in the importation of the crustaceans from neighboring states, a change would have to be made simultaneously throughout all of the lobstering states. Fishermen are generally opposed to the larger legal size since it would, for a time, diminish their catch.

In 1889, 175,000 traps caught 40 million pounds of lobster, a catch of over 225 pounds per trap. Since then, there has been a dramatic decline in the fisheries to less than 14 pounds per trap. In Canada, the minimum legal size is set by the Federal Government. It varies by region from 2 1/2 inches to 3 3/16 inches. In good Canadian lobster areas, there can be as many as 10,000 traps per square mile! Lobsters cannot be taken by divers in Canada, Maine and New Hampshire. Massachusetts and Rhode Island restrict their permits to residents only, though the Bay State has a very liberal residency requirement. New York and Connecticut issue permits to residents and non-residents. Permits are not required for New Jersey, Delaware and Maryland. In these states, the inshore sandy bottom affords lobsters little protection, thus wrecks are their main refuge. Occasionally, it is reported that breakwaters such as the one found off Lewes, Delaware yield some lobsters. Commonly found around such areas in the northern part of its range, the American lobster is rarely caught close to shore south of New Jersey.

In 1980, Massachusetts scuba divers represented 24 percent of the fishermen reporting a lobster catch. They landed, however, only one percent of the total harvest. Commercial lobstermen, comprising 21 percent of fishermen reporting, landed 96 percent of the total catch. Figures are similar for Connecticut and Rhode Island. Though divers obviously do not significantly contribute to the depletion of the lobster stock, they nevertheless have a great stake in their survival. Careful harvesting and support for an increase in the minimum legal size will contribute to that end.

4 DIVER UPDATE

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Autonomic response ... means the body breathes in and out automatically, in or out of the water. Unless you find yourself concentrating on inhalation and exhalation cycles while you dive. When you own a premium regulator, you shouldn't pull for airflow or push to exhale. Breathing should be easy, smooth and natural. Enter the Omega regulator. Immediately notice that it breathes simultaneously, with you, not after you. No surge, no unpleasant feedback; just gentle, effortless breathing.

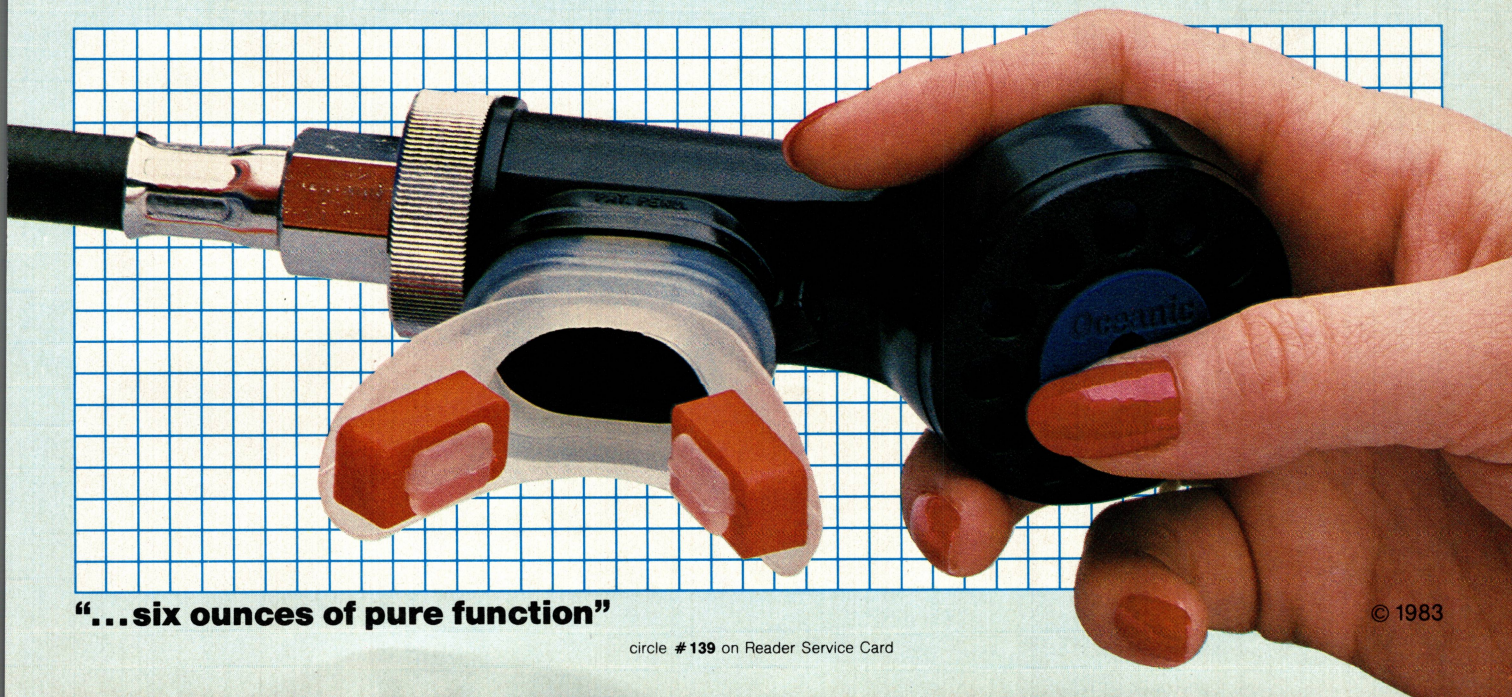
Third stage. Typical engineering begins at the tank and concentrates on cold, hard facts. Oceanic starts with you, the third stage. First we provided air flow rates in excess of human needs. Then we added our exclusive hot-water moldable mouthpiece tabs for elimination of jaw fatigue. The clear, clean, optional silicon mouthpiece completes the picture.

Second stage. We created a **downstream** servo-controlled air valve by looking at airflow from your point of view, not the tank side. The air valve is dynamically balanced allowing airflow rates in excess of needs throughout **your** operational needs. We arrange the multiple discharge ports so you don't see bubbles. The flush mounted purge button is perfectly located for thumb operation. The Oceanic Omega second stage is completely stable in or out of your mouth, in shallow water or deep. Here is quality and value you can count on.

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Photographer's note: An Oceanic Omega regulator will put an end to your favorite model having "hub-cap mouth."

Omega precision regulators: dependable, strong and corrosion-free for high performance and diving comfort. It's time to switch to Omega and **put your air on autonomic.**



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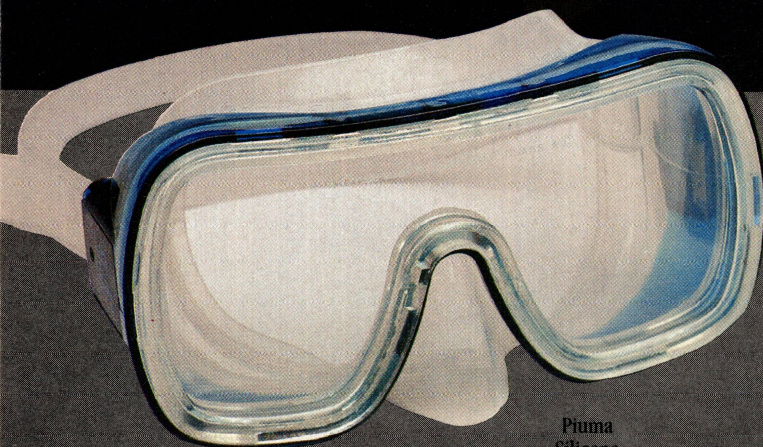
FROM THE BAHAMAS TO BONAIRE — SERIOUS DIVERS ARE HAVING FUN WITH CRESSI'S NEW SILICONE MASKS

Jeanette Holmes photographed at the exclusive
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LIF-O-GEN

Lif-O-Gen's Twin-Pac Portable Emergency Oxygen Kit is highly useful and cleverly designed. For emergency situations which call for the use of oxygen until trained medical personnel can be summoned, the Twin-Pac unit is extremely easy for untrained personnel to use.

The Twin-Pac, Lif-O-Gen catalogue #31-01-0555, comes complete with two cylinders of compressed oxygen, push-button regulator and a facemask, in a ruggedly built, high impact-resistant plastic case. In short, the unit is entirely self-contained. The Twin-Pac's light weight and compactness are its outstanding features. In a package only 23 x 8 1/4 x 4 inches, weighing less than 12 pounds, you have everything you need to deliver a minimum of 30 minutes of oxygen.

Before examining the components and design of the Twin-Pac in more detail, it is important to consider why any type of portable emergency oxygen kit might be practical for a diver to own. There are a number of emergency situations in which oxygen has a vital application. Perhaps the most obvious are air embolism or suspected bends. There are numerous documented cases where an emergency oxygen supply has helped a diver survive an embolism. Other situations in which oxygen could be extremely beneficial include a near drowning, coronary problems, or any time a person is having difficulty breathing.

While examining the Twin-Pac I spoke with several certified Emergency Medical Technicians about the use of oxygen in emergency situations. They unanimously pointed out that administering oxygen can only be helpful and not harmful to victims, with very few exceptions. It must be understood, the EMT's pointed out, the Twin-Pac, like most emergency oxygen, is an inhalator system, not a resuscitator. It is useful only to people who are breathing and have an unobstructed airway.

Once the usefulness of oxygen is recognized, the design of the Twin-Pac becomes even more impressive. The top of the attractive blue case is constructed with an easy to grip handle. By merely unhinging two clasps the case can be pulled open. Packaged neatly inside you'll find the two O₂ bottles, regulator and mask. In addition, there is an immediately obvious set of directions firmly affixed to the inside of the case. The instructions are to the point and quite easy to follow. No matter how well trained you are, in an emergency a set of instructions and some guidance are appreciated.

Each of the O₂ cylinders contains 103 liters of U.S.P. oxygen. In lay terms, 103 liters translates into a minimum of 15 minutes of oxygen. To utilize the O₂ all you

Twin-pac portable emergency oxygen

BY
**MARTY
SNYDERMAN**

photos/Fred Fischer



The Life-O-Gen Oxygen Kit has a sturdy plastic carrying case, two oxygen cylinders, a regulator and facemask. The kit weighs under 12 lbs.

need to do is thread in the O-ring sealed regulator by turning it clockwise as indicated by the directions. The regulator has an easy to read contents gauge which denotes, on a continuous scale, how full the cylinder is. In an actual emergency, the instructions state that before activating the oxygen flow, the administrator should place the mask over the victim's mouth and nose and connect the five foot long (3/16 inch inside diameter) tube between the mask and regulator. A series of notches on the regulator hold the tubing in place while an easy to adjust elastic retaining strap holds the oronasal mask in place. The lightweight mask is anatomically crafted to fit any facial contour. A rotation connector feature allows the victim the convenience of being in almost any position and to move without interfering with the oxygen flow.

To start the flow all you need to do is depress a button on the side of the regulator marked Control Button. To ensure a continuous flow, the button can be rotated one-quarter turn and locked in place. The control regulator is adjusted to deliver a continuous flow of six liters of oxygen per minute. Discussions with EMT's assured me that the six liter flow rate is more than sufficient: Even during times of heavy physical activity a full grown adult male needs only 3.22 liters per minute.

Setting up the Twin-Pac is quick and easy. With only a few minutes of familiarization I found that I could set the unit up in operating order in less than one minute. Changing the regulator from one cyl-

inder to the next can be accomplished in even less time. All of the parts are very easy to get to and to handle. From the time you grab the case through the time you administer the second cylinder there is no task that requires excessive dexterity or strength. In a real emergency, the ease with which rescue equipment can be used cannot be overemphasized.

A couple notes of caution will help you take care of a Twin-Pac and ensure that it will be in working order if the need arises. Remember that O₂ is highly combustible and the cylinder should never be subjected to heat over 130° F. The contents are compressed gas so when in use or when being stored never put the cylinders in a position where they can fall. Periodically checking the pressure of the cylinders is a wise precaution. The cylinders cannot be refilled, so once used they should be replaced with Lif-O-Gen replacement oxygen supply cylinders, catalogue #510.

To sum it up, I found the Twin-Pac to be a well designed, easy to use product. The Twin-Pac is the type of item you hope you will never have to use, but if you do, there is no question it just might be worth more than its proverbial "weight in gold."

The Twin-Pac Portable Oxygen Kit retails for \$134.95. Lif-O-Gen is a division of Chemetron Medical. The distributor of Lif-O-Gen products to the diving industry is Midwest Life Support Systems. For information contact: Midwest Life Support Systems, 9832 Manchester Rd., St. Louis, MO 63119, (314) 968-8089.

FOCUS ON LENSES

PART II Adapters, Close-focusing, Close-up and Extension Tubes

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

The purpose of this article is to help you choose the lenses you need for U/W photography. We talked about wide-angle, normal and telephoto lenses last month, and will conclude this series with wide-angle adapters, more about close-focusing lenses, close-up lenses and extension tubes.

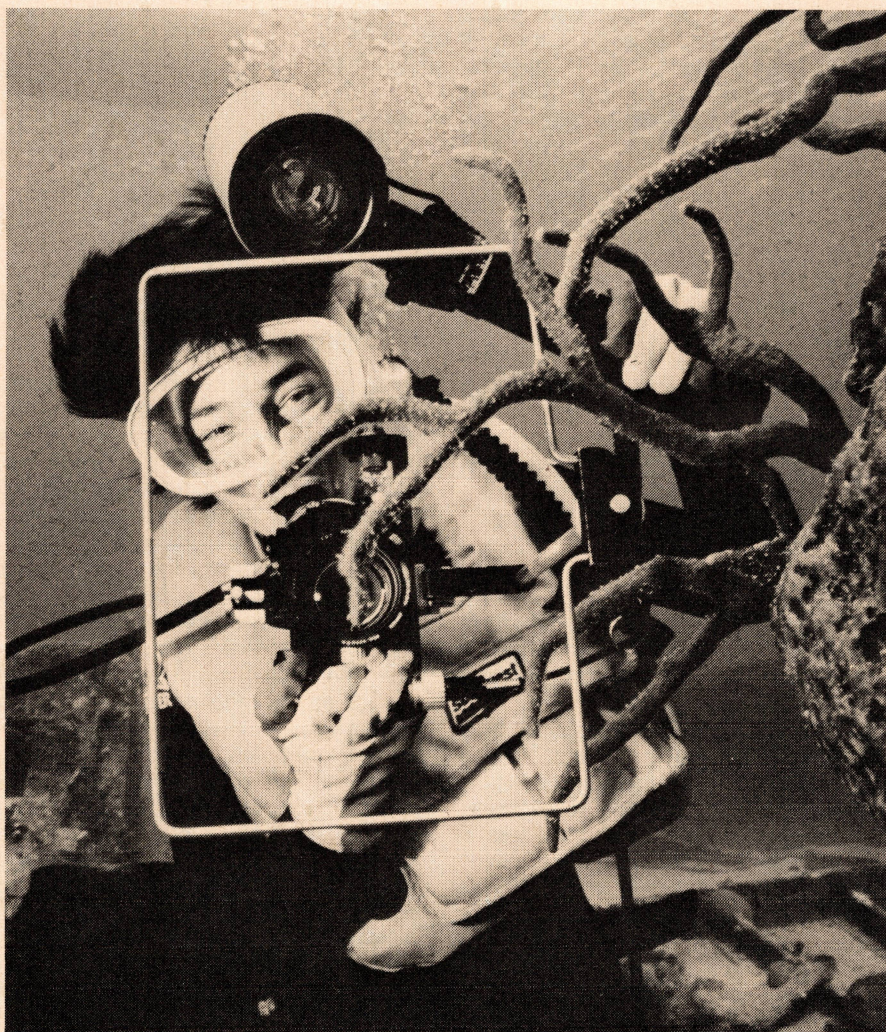
WIDE-ANGLE ADAPTERS

A wide-angle adapter is a supplementary lens you place over the front of your camera lens to widen its angle of view. A wide-angle adapter has no moving parts; you use the aperture and focus controls of the camera lens. And, since an adapter has little effect on the amount of light passing through the lens, there is no noticeable effect on maximum or minimum aperture. But because an adapter changes the focused distance of the regular lens, special scales and/or instructions are provided.

At this writing, Aquacraft distributes three Novatek wide-angle adapters and Oceanic U.S.A. distributes the Subawider II wide-angle adapter, all of which fit over the Nikonos 35 mm lens.

The Novatek 28 increases the angle of view of the 35 mm lens to approximately the 59 degree diagonal angle of the 28 mm. While a 28 mm lens is optically better than a 35 mm with an adapter, the Novatek 28 adds versatility and allows you to focus in as close as 16 inches.

The Novatek 20 increases the angle of view of the 35 mm lens to approximately 90 degrees, the picture angle of a 20 mm lens, and focuses down to three feet. The Novatek Fisheye lens is a specialty lens for extreme wide-angle photography. It widens the angle of view of the 35 mm lens to 150 and the 28 mm lens to 160 degrees. The fisheye format is a circular picture area, with the top and bottom of this area being slightly cropped within the 35 mm slide or negative area. With the 28 mm lens, the circular picture area will be smaller and will be completely contained within the borders of the 35 mm negative.



Cathy takes a shot with a Nikonos camera and Close-up Kit. The Close-up Lens fits over the normal lens (35, 28, or 80 mm) and reduces the focused distance to 9 1/4 inches.

Decals with focusing instructions and depth of field tables are attached to the sides of all Novatek lenses. There are no Novatek 28 or 20 accessory viewfinders at this writing, but other companies' viewfinders can be used with them. We know of no viewfinder that matches the Novatek Fisheye lenses—we just point the

camera at the photo subject and shoot.

The Subawider II fits over the Nikonos 35 mm lens and widens the angle of view to about 90 degrees. Minimum focus is 0.25 meters (about 10 inches) so you can take wide-angle close-ups and the dome port is protected by a lens shade. An optical viewfinder and decals for the aperture

and focus scales are included with each Subawider purchased.

The two major advantages of wide-angle adapters, when compared to regular wide-angle lenses, are: (1) You can install or remove them underwater, and (2) the adapters cost less than wide-angle lenses. The disadvantages, in our opinion, are: (1) The optics of an adapter aren't as good, (2) the adapters are more cumbersome to use, and (3) they can slip out of alignment if you aren't careful. To sum up, the wide-angle adapters are good, low-cost lenses for amateur U/W photographers. We have a dozen wide-angle adapters for introducing our students to wide-angle U/W photography. But for professional work, the Nikon 15 mm lens for the Nikonos is best.

CLOSE-FOCUSING LENSES

Normal and telephoto close-focusing lenses (often called macro or micro lenses) are available for some 35 mm SLR and larger format cameras. You can focus these from infinity to as close as a few inches for image/subject ratios down to 1:2. (Note: The first number refers to the size of the image on film; the second number refers to the subject's life size. Thus, a ratio of 1:2—pronounced, "one to two"—means that a one-inch image on film was produced by a two-inch subject.) Close-focusing lenses are frequently used for close-up U/W photography.

For 35 mm SLR cameras, the normal (50 or 55 mm) close-focusing lenses are the most popular for image/subject ratios from about 1:3 to 1:10 or even larger. And, for skitterish subjects that are difficult to approach, telephoto lenses (with focal lengths of about 100 or 105 mm) allow you to double the camera-to-subject distance without increasing picture area. Focusing with such a telephoto lens requires both skill and patience because depth of field is almost non-existent at small picture areas and the wide apertures used for viewfinding and focusing. If your subject moves only a fraction of an inch as you focus on its eyeball, you will lose sharp focus in your viewfinder.

Close-focusing lenses have an important effect on minimum aperture: When focused for close distances, the lens elements are extended out further from the film plane. This changes the mathematical relationships that determine the f stops. The f stops marked on the aperture scale (called relative f stops) are accurate when the lens is focused for infinity. But when the lens is focused for extremely close distances, and the lens elements are extended further away from the film, the f stops now have higher numbered values (called effective f stops). As examples, if you focused the lens down to a 1:3 image/subject ratio, the effective f stop would actually be f29 even though the aperture scale shows f22. At 1:2, the effective f stop is f33; and at 1:1, the ef-

NIKONOS ACCESSORIES

If a wide-angle adapter focusing scale is metric, simply think of meters as yards (1 meter = 39.37 inches). Although you will be off a few inches, wide-angle depth of field will cover your error.

The space between the Nikons lens and the accessory should be flooded with water, and forgetting to flood this space is a common error. Even if the accessory has slots for self-flooding, air bubbles can adhere to the glass surfaces. If bubbles persist, remove the accessory underwater and wipe them off. Remember, greasy fingers leave smears.

Be sure to press the accessory firmly in place before taking pictures. If bumped, it could tilt out of alignment with the Nikonos lens.

Don't overtighten the screws that hold accessory lenses in place. You could upset the O-ring seal between the Nikonos lens and camera body while attempting to remove the accessory underwater.

Use a safety cord to tie small accessories to the camera to prevent loss. Some accessories float and could easily float up out of view if they detach from the camera.

Always take a moment to recheck focus and aperture settings when attaching or detaching the accessory underwater. This is when errors usually occur.

When using screw-on close-up lenses, turn the lens counter-clockwise for a quarter or half turn before turning it clockwise to screw the lens in place. This prevents cross-threading and possible thread damage. The lens need only be turned in finger tight.

These techniques will eliminate common errors made using Nikonos accessories.

fective f stop is f44. This is why you must hold the strobe so close for macro photography—you are working with higher numbered stops than those shown on the aperture scale. (Note: For more detailed information about effective f stops, look up bellows factor in a standard photography textbook.)

NIKONOS 80 MM LENS

Depth of field is limited with the 80 mm lens because of the small picture area. At a focused distance of four apparent feet, for example, and with an aperture of f11,

depth of field is less than six inches. Imagine how difficult it would be to estimate focused distance by eye—especially with a moving subject. If, however, you had the camera on a tripod and had measured the distance to some creature's lair, you might get a shot of an unapproachable critter such as a jawfish. The best use for the Nikonos 80 mm lens, in our opinion, appears to be for topside shots or U/W close-ups with the Nikon Close-up Kit.

SUNLIGHT AND TELEPHOTO

If sunlight is the major light source for exposures with telephoto lenses, camera and subject movement can cause blurred pictures. As a rule of thumb, the minimum topside shutter speed for a hand-held camera is about the same as the focal length of the lens. For example, a minimum shutter speed of 1/100 second is recommended with a 100 mm lens. And, because many 35 mm cameras will only synchronize with strobes at shutter speed settings less than 1/100 second, blur, owing to camera or subject movement, can be a problem.

If, however, a powerful strobe is providing enough light for an exposure at a small aperture, the blurring effect of a slow shutter speed is reduced. Likewise, if you have a camera such as the Nikon FM-2, which synchronizes with strobe at 1/200 second, the faster shutter speed will stop the action better. A faster shutter speed will also tend to darken midwater backgrounds, which may or may not be the effect desired.

SUPPLEMENTARY CLOSE-UP LENSES

Supplementary close-up lenses are placed over the regular camera lens to reduce the focused distance. As with wide-angle adapters, the aperture and focus controls of the regular camera lens are used, and there is virtually no change in maximum or minimum aperture. (Because the regular camera lens doesn't extend outward you don't get into effective f stop calculations.)

For housed cameras behind flat lens ports, you screw the close-up lens into the accessory threads at the front of the lens mount the same way you would screw in a filter. Now, you can use your normal or telephoto lens for close-ups. The disadvantage of this method is that once the close-up lens is in place, you must surface and open the housing to remove or change the close-up lens.

If you have a dome housing port, the close-up lens is required for focusing at normal U/W distances because of the optical effect of the dome. Thus, you lose close-up capability with normal lenses such as a standard 50 mm for a 35 mm camera. Also, the focusing scale is compressed—the distance markings on the scale no longer directly relate to mea-

sured or apparent U/W distances.

Supplementary close-up lenses are also available for some amphibious 110 cameras, such as those from Hanimex and Sea & Sea. And, some Ikelite housings for 110 cameras have a close-up lens that slides in place over the port in front of the camera lens.

NIKONOS CLOSE-UP LENSES

Supplementary close-up lenses for the Nikonos are available from Aquacraft, Hydro Photo and Nikon. All of these lenses, and all the discontinued lenses not covered in this article, can be attached or removed underwater.

Aquacraft has three Novatek close-up lenses for the Nikonos 35 mm lens. The Plus/2 covers a picture area of 8 x 12 inches, the Plus/3 covers 5 x 7 inches and the Plus/5 covers 4.5 x 6.5 inches. The Plus/2 and Plus/3 can be aimed by eye or with an accessory wand, and the Plus/5 has a built-on focal frame that encloses half the picture area. A special model of the Plus/5 lens (catalog #S-83) is available for the Nikonos 28 mm lens. All of the Novatek close-up lenses press fit over the Nikonos lens and have a nylon setscrew for adjustment.

Hydro Photo has a set of three close-up lenses which screw directly into the accessory threads of a Nikonos 35 mm lens. Lens T1 produces a close-up picture area slightly larger than 2 x 3 inches, T2 produces a 4 x 6 inch picture area and T3 produces an 8 x 12 inch picture area. These lenses are aimed with simple wands. Hydro Photo also has a close-up lens for the Nikonos 28 mm lens that covers a picture area of 8 x 12 inches, 12 inches in front of the lens.

Nikon's Nikonos Close-up Lens fits over a Nikonos 35, 28 or 80 mm lens and reduces the measured U/W focused distance to 9¼ inches from the front of the lens. A support rod can be used to hold a field framer that outlines the picture area with a 10 mm (slightly less than a half inch) space between the edge of the picture area and the framer. When used with the 28 mm lens, the U/W image/subject ratio is 1:6. With the 35 mm lens, the ratio is 1:4.5; and with the 80 mm lens, 1:2.5. In air, you can use the 35 mm lens with the 28 mm framer, and the 80 mm lens with the 35 mm framer, for ratios of 1:4.5 and 1:3, respectively. Because the magnifying surfaces are internal (between the two glass elements), and the lenses are focused for infinity rather than minimum distance, the same camera-to-subject distance is used in air and U/W.

For subjects that are difficult to frame, the field framers can be removed from the support rod. And, to go a step further, you can remove the support rod from the lens if it bumps into rock or coral. After you have developed a feeling for the picture area covered, you can leave the field framers off altogether.

Nikon's Close-up Outfit has the best corner-to-corner sharpness with less color aberration than the other lenses. However, when projecting your slides you may not see much difference. This is because the projector may not produce images sharp enough to show the differences. But if you are having large, custom color prints made, the higher quality of the Nikon optics will be apparent.

EXTENSION TUBES

An extension tube is a cylinder placed between the camera body and the lens. Its purpose is to extend the lens and thus reduce the focused distance. Extension tubes, also called extension rings, are sometimes used with 35 mm SLR cameras and close-focusing lenses to reduce image/subject ratios down to 1:1. Once an extension tube has been attached to a Nikonos or housed camera, you are locked in on that decision as long as you remain underwater.

Extension tubes are commonly used with Nikonos cameras, with the three most common sizes being 1:3, 1:2 and 1:1. Some 1:1 and 1:2 tubes can be stacked to produce 2:1 image/subject ratios—with images that are twice life size. Extension tubes are sold with framers for use with a Nikonos 35 mm or 28 mm lens. Please note: The only difference between extension tubes for 35 mm or 28 mm lenses are the dimensions of the focal frames! If you have both lenses, you may be able to save money by buying additional framers without tubes.

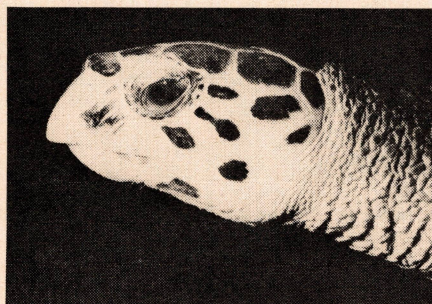
Some extension tube framers are poor-

fect close-focusing lenses also apply to extension tubes. With the Nikonos lens set for the relative aperture of f22, the effective apertures are really f29 with a 1:3 tube, f33 with a 1:2 tube and f44 with a 1:1 tube. Depth of field is severely reduced because of the tiny picture area. With the Nikonos lens set for f22, depth of field is about ¾ inch with a 1:3 tube, 3/8 inch with a 1:2 tube and 3/16 inch with a 1:1 tube. With this small amount of depth of field, you can see why the focal frame must be adjusted accurately for the correct focused distance.

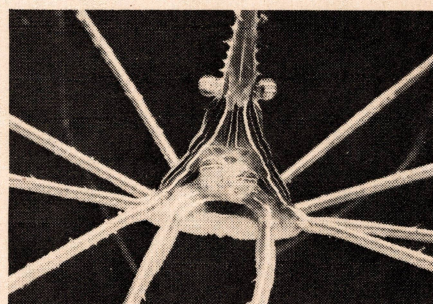
Generally, the larger the picture area, the easier the extension tube is for beginners to use. The 1:3 tube has greater depth of field, and the beginner has larger subjects to frame. But the 1:1 tube, with its tiny picture area and severely limited depth of field, requires greater skill in subject selection and aiming with the framer. We usually recommend beginning with a 1:2 tube and adding additional tubes later.

C/U LENS OR EXTENSION TUBE?

"Which is best with my Nikonos, a close-up lens or an extension tube?" is a frequently asked question. The answer is often easily determined because it depends on subject size. Generally, extension tubes are used for small picture areas with image/subject ratios of about 1:1 to 1:3, and close-up lenses are used for larger picture areas with image/subject ratios of about 1:4 and larger. Thus, if you begin with an intended subject and



Sea turtle, Nikonos with close-up lens.



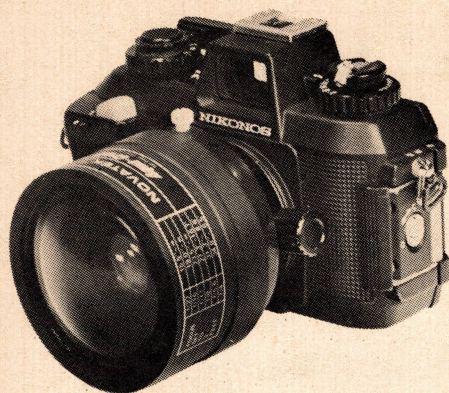
Arrowcrab, Nikonos and extension tube.

ly designed. We've seen framers that were not adjusted correctly for focused distance and framers that indicated the picture area incorrectly. And, in a few extreme cases, the wrong framers were sold with the tubes. Before buying an extension tube, sight through the framer toward the center of the lens. Although the support rods may have a variety of bends, the framer (the part that partially surrounds the picture area) should be square to the center of the lens. If the alignment doesn't look right, don't buy it.

The same effective f numbers that af-

then choose a lens system to match that subject, the choice of close-up lens or extension tube will be dictated by the subject's size. But if you have no particular subject in mind, and want the greatest flexibility, the close-up lens would be a better choice.

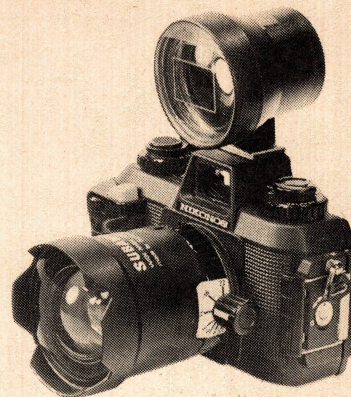
There is an approximate overlap, however between the 2.25 x 3.23 inch picture area of the Hydro Photo T1 Close-up Lens and a 1:2 extension tube. And, this, in our opinion, is the only situation where the close-up lens vs. extension tube question really arises. The advantages of



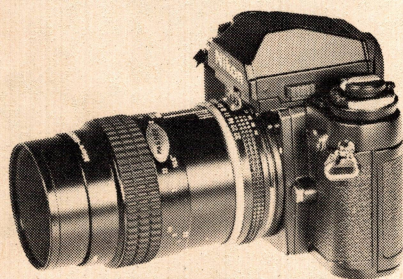
The Novatek 20 adapter fits over the standard Nikonos 35 mm lens.



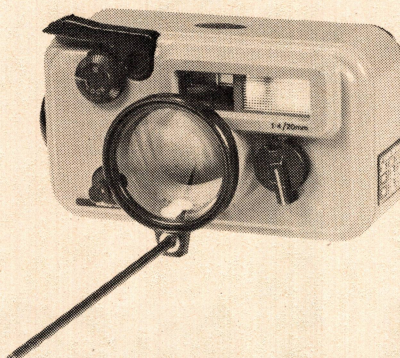
The Novatek 28 (left), Fisheye and Novatek 20 wide-angle adapters.



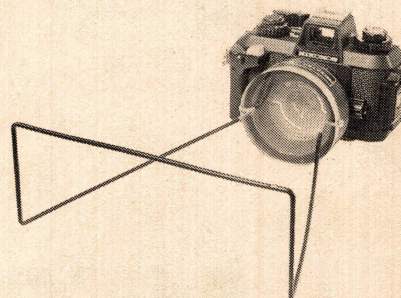
The Subawider II widens the angle of view of the Nikonos 35 mm to 90°.



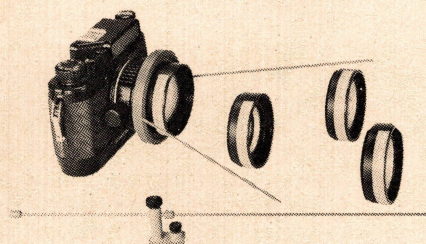
The Nikon 55 mm Micro-Nikkor is a popular lens for fish photography.



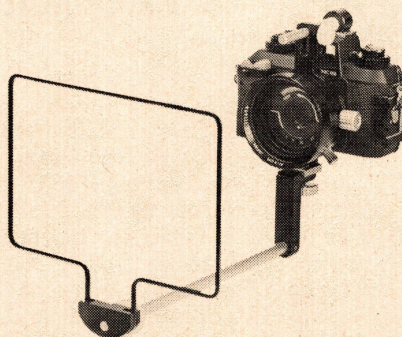
The supplementary close-up lens and aiming wand for the Hanimex camera.



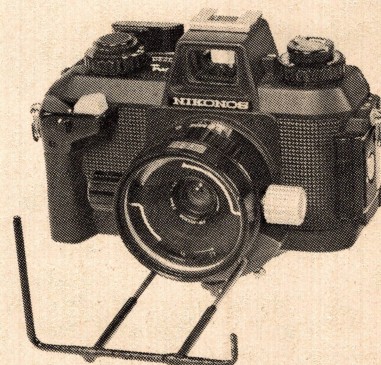
The Novatek Plus/5 close-up lens has a framer that outlines half the picture.



The Hydro Photo T1, T2 and T3 screw into the Nikonos accessory threads.



The Nikon Close-up Lens has a removable support rod and framer.



Extension tube and framer for Nikonos (authors cut left upright).

the close-up lens are that (1) it can be attached or detached underwater, (2) it requires less light for an exposure because it doesn't involve effective f numbers, and (3) a single wand may allow you to photograph in small crevices not accessible to a framer. The advantages of the extension tube are that (1) the higher numbered effective f stops produce greater depth of field, (2) it is usually easier to aim the camera with a focal frame, and (3) because there are no additional optics in front of the regular camera lens, extension tubes can produce sharper images.

In most cases, we would choose the extension tube over a close-up lens for such a small picture area.

FOR MORE INFORMATION

For information directly from the manufacturers and distributors mentioned in this article, write directly to: Aquacraft (\$1 for catalog) 7992 Miramar Rd., San Diego, CA 92126. Hanimex, 1801 Touhy Ave., Elk Grove Village, IL 60007. Hydro Photo (free brochure) Box 548, Port Ludlow, WA 98365. Ikelite (\$1 for catalog) P.O. Box 88100, Indianapolis, IN 46208.

Nikon, Inc. (free brochure) 623 Stewart Ave., Garden City, NY 11530. Oceanic U.S.A. (formerly Farallon/Oceanic, \$3.50 for catalog) 14275 Catalina St., San Leandro, CA 94577. Sea & Sea U/W Camera Equipment (\$1 for complete catalog, individual product brochures free) 1334 S.E. 17th St., Ft. Lauderdale, FL 33316. For two additional catalogs of U/W photographic equipment from other sources send \$1 to: Creative Whale, 28 W. 285 Aurora Rd., Warrenville, IL 60555; and Helix, 325 West Huron St., Chicago, IL 60610. 

SDM SPECIAL SERIES ON REGULATORS

PACER 650XL



DACOR PACER 650XL

TEXT AND PHOTOGRAPHY BY GEORGE COZENS

Pacer, as you might recall, is an acronym for Positive Air Controlled Equalizing Regulator. It was coined by Dacor a few years ago when the company introduced a line of regulators with some innovative features. Not long after the popularity of this equipment was established, the Pacer XL appeared—the improved version of the original Pacer regulator series—Dacor called it “an improvement on a better idea.”

And well it might be. The Pacer XL regulators represent Dacor's latest effort in the long and continuing process of developing and upgrading its life support systems for scuba diving. This involvement with regulator design and construction began back in the mid-1950's, and was traced briefly in an article highlighting the Pacer 950XL (SDM, September 1982). This month I'd like to direct your attention to the Pacer 650XL.

Some people might relegate the 650XL to second place, behind the top-of-the-line 950XL, perhaps, because of its lower model number, or its less expensive price (by \$20). If so, the 650XL must be a very close second. Essentially the only difference in the two models is the first stage: The 950XL is based on a balanced

diaphragm design, the 650XL makes use of a balanced flow-through piston.

In examining the Pacer 650XL more closely, it is obvious that the first stage is quite heavy. The body is machined from forged naval brass (referring to the metal alloy, not to the military), with consecutive platings of copper, nickel and then chrome, for greater corrosion resistance. The yoke is similarly constructed, and has a working pressure rating of 3000 psi. Optionally available is a DIN connection, with the same pressure rating, which can be substituted for the yoke when attachment to a European type tank valve is desired. Stainless steel is used in the flow-through piston and main spring, and Teflon in the high pressure valve seat.

In addition, the first stage offers a number of nice features: (1) The yoke swivels, in order to position the body and hoses more conveniently; (2) Two high pressure ports, marked HP, are on opposite sides of the body, near the base of the yoke; (3) Four (unmarked) low pressure ports are in a swivel cap at the end of the body, allowing for more direct orientation of the hoses; and (4) A high air capacity, supplying intermediate pressure air of 140 psi at up to 1800 liters (approximately 64

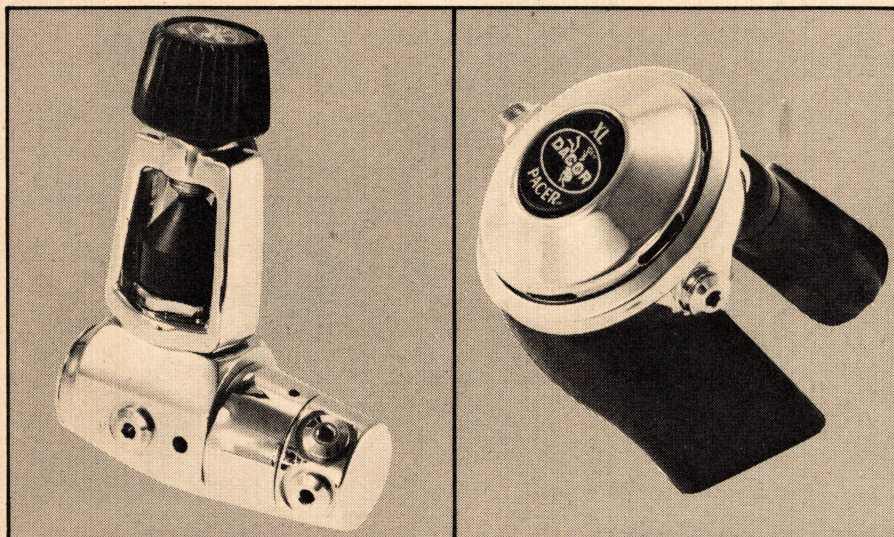
cubic feet) per minute, when the tank pressure is about 3000 psi.

The second stage is identical to that used on the Pacer 950XL. It is based on a downstream demand valve and is housed in a two piece, stamped brass case secured with a brass clamping ring, all of which is triple chrome plated. The demand valve body is also of plated brass, has a neoprene rubber low pressure seat, and is controlled by a stainless steel demand lever. The diaphragm consists of very thin neoprene rubber—having essentially no body (and, therefore little resistance) of its own, this diaphragm is quite responsive to slight pressure changes. Neoprene rubber is also used in the exhaust tee as well as the mouthpiece, although optional mouthpieces are available in soft gum or silicone rubber. Spring-loaded and flush-mounted, the large, plastic purge button is easily accessible to any fat fingers, even when bundled up in heavy mittens or gloves.

As a result of its Pacer heritage, this second stage has a number of interesting features. The mouthpiece tube contains a partition, dividing the opening into two channels, both of which can conduct air to the diver. However, when the second

stage is not in use and hanging at the end of the hose, the lower of the two channels admits water into the interior which displaces the air there and stops any free-flow. This is what Dacor calls its anti-free-flow device. The Venturamatic Booster Clip is a long name given by Dacor to an adjustable metal clip that partially sur-

rounds the demand valve and serves to deflect the incoming air in an effort to boost the venturi effect within the second stage. This clip can be adjusted (without disassembling the unit) to increase or decrease its response. Venturamatic Flow Vane is another lengthy name applied to a simple, but innovative device. This vane looks like a tab or flag and is an integral part of the stainless steel demand lever. Normally, as the flow of air increases, the growing venturi effect sucks in on the diaphragm, pushing the demand lever further, for more air flow, greater venturi, and so on. If it is not controlled, a runaway situation would occur. Enter the Venturamatic Flow Vane. At higher flow rates this flap intercepts more and more of the air flow, deflecting some of it back into the second stage—thus, controlling the venturi and preventing a runaway.



The first stage of the Pacer 650XL has two high pressure ports, and four low pressure ports on a swivel cap. It has a pressure rating of 3000 psi and can supply intermediate pressure at 140 psi. The second stage features an access port for external adjustment of the demand valve (by an authorized Dacor dealer).

rounds the demand valve and serves to deflect the incoming air in an effort to boost the venturi effect within the second stage. This clip can be adjusted (without disassembling the unit) to increase or decrease its response. Venturamatic Flow Vane is another lengthy name applied to a simple, but innovative device. This vane looks like a tab or flag and is an integral part of the stainless steel demand lever. Normally, as the flow of air increases, the growing venturi effect sucks in on the diaphragm, pushing the demand lever further, for more air flow, greater venturi, and so on. If it is not controlled, a runaway situation would occur. Enter the Venturamatic Flow Vane. At higher flow rates this flap intercepts more and more of the air flow, deflecting some of it back into the second stage—thus, controlling the venturi and preventing a runaway.

With the advent of the XL series, the Pacer second stages acquired additional improvements, leading to a reduction in the exhalation effort, increased comfort and simplified maintenance. The exhaust system was modified, including: enlargement of the dual exhaust ports by 40 percent; changing the exhaust valves to silicone rubber and giving them a new, stronger, more responsive convoluted

ond stage of the regulator.

For the Pacer regulators Dacor offers several optional accessories: an octopus second stage with a bright yellow hose protector for easy recognition; a long 39 inch hose (13 inches longer than the standard hose); and a yellow/black tank decal (identifying the octopus diver). There is also a mouthpiece plug for securing the octopus second stage when not in use; two different low pressure, swivel type, multiple hose adapters to permit the attachment of up to three hoses to a single LP port on the first stage; mouthpieces in three different materials (already mentioned); and a Polar Kit, for environmental protection of the second stage of the Pacer 650XL—other kits are available for the 950XL and 350XL.

Normal, routine maintenance is all that is recommended for the 650XL—nothing special required. Annual service at an authorized Dacor service center is suggested—in fact, required—if you want to keep the 10 year limited warranty in effect. Typical service charges may range from about \$12 to \$25 for labor, with the average being around \$18. Parts may cost an additional \$17 to \$18. This includes replacing the parts most likely to show wear and/or normal deterioration with use and age: the low pressure dia-

phragm; the high and low pressure valve seats; the exhaust valves; and the sintered filter; but not the O-rings, which are about 70 cents each. If you tend to chew on your mouthpiece, a replacement would cost you another \$5 to \$7, depending on whether your tastes go for neoprene or silicone rubber.

I do not want to give you the impression that Dacor's service and parts costs are out of line. On the contrary, I believe these charges are nominal, and I want to thank Dacor for their honesty. I have included this information, however, and hope to continue doing the same in the future, because one reader suggested that service charges can be a significant fraction of the overall cost of keeping any regulator in operation.

Because of the rather conventional design (innovative, but not exotic), use of non-corrosive materials, quality construction, 100 percent inspection (of the individual parts at least once, and of the completed units at least twice: at the time of assembly and, again, just prior to packaging), the new owner of a Pacer XL regulator can be assured of satisfactory performance for many years, with only minimal care and reasonable repair/service costs.

The evaluation of this 650XL regulator closely followed the exercise done with the 950XL last year. If there were any noticeable differences, they could, I believe, be attributed to a little finer tuning of this 650XL. Inhalation and exhalation resistances seemed to be quite low, throughout the range of breathing cycles from very faint to exaggerated. Different orientations (looking up and down, on my head, etc.) resulted in only slight changes in the breathing effort, and the differences noticed could be explained by the Laws of Nature that govern a single hose regulator. In none of the various positions did I detect any water leakage—indeed, it seems to be a dry regulator. When I looked horizontally, very few exhaust bubbles rose within the field of view, and these disappeared when I looked down only a few degrees. Freeflowing was observed when the second stage was full of air and held in the water with its mouthpiece directed vertically upward, but would stop when pointed horizontally, or downward. No freeflowing occurred in any position when the second stage was flooded with water. Generally, the Pacer 650XL performed very well, and exhibited only one idiosyncrasy: When I rolled my head to the right or left (with an end of the exhaust tee pointed up), or when standing on my head, the unit bubbled (freeflowed) ever so slightly.

With a retail price of \$225, easy maintenance, and good performance, I would recommend the Dacor Pacer 650XL for just about any dive application. 

THE INFLATABLES

ZODIAC



ZODIAC'S NEW CONCEPT— THE INFLATABLE KEEL OFFERS AMAZING PERFORMANCE

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Zodiac's Mark III Futura represents a radical departure in hull design for inflatable boats. It offers the smooth, stable ride characteristics and handling of a rigid hull, with the lighter weight, impact resistance and portability of an inflatable. Up to now, owners had to accept a harsh ride and skidding on turns as the price of the advantages of an inflatable boat with an inflatable keel. The Zodiac Futura has changed all that.

As inflatables became accepted by boat enthusiasts all over the world, people began to demand more comfort and better handling. One solution was to mate inflatable tubes to a fiberglass hull. However, a hybrid sacrifices some portability and interior space. It poses other dilemmas for a company which exports most of its products. Shipping costs for a rigid boat are considerably higher than for one which can be folded. The hulls could be produced overseas and attached to the tubes there, but quality control would be compromised. Therefore, Zodiac engineers set out to see if a hybrid's handling characteristics could be achieved in an

inflatable boat with an inflatable keel.

Research and development took over eight years. The final result is the Mark III Futura. Its new hull concept, a Zodiac patent, brings a new dimension to inflatable boat performance. Two small shock absorbing tubes are in the angle between the hull bottom and the main buoyancy chambers, running the entire length of the boat. They are linked to the main tubes by narrow fabric strips, which form the lifting planes. This allows the hull bottom to meet the buoyancy tubes higher up and further in from the sides of the boat, resulting in a deeper V configuration. In effect, the Futura has three keels, or lifting surfaces. The buoyancy tubes also reinforce the main tubes, giving them greater longitudinal rigidity.

Air flowing under the boat between the tubes provides a suction effect, making the Futura handle like a cathedral or tunnel hull. Our test ride was impressive, to say the least. The 50 horsepower engine brought it up on an instant plane, not bow first like most boats, but level, as a unit. The seas were smooth, but I did my best

Two small, shock absorbing tubes are in the angle between the hull bottom and the main buoyancy chambers of the Zodiac Mark III Futura. This, in effect, gives the Futura three keels, or lifting surfaces, making it handle like a tunnel hulled boat—stable, and no sideslip during sharp turns.

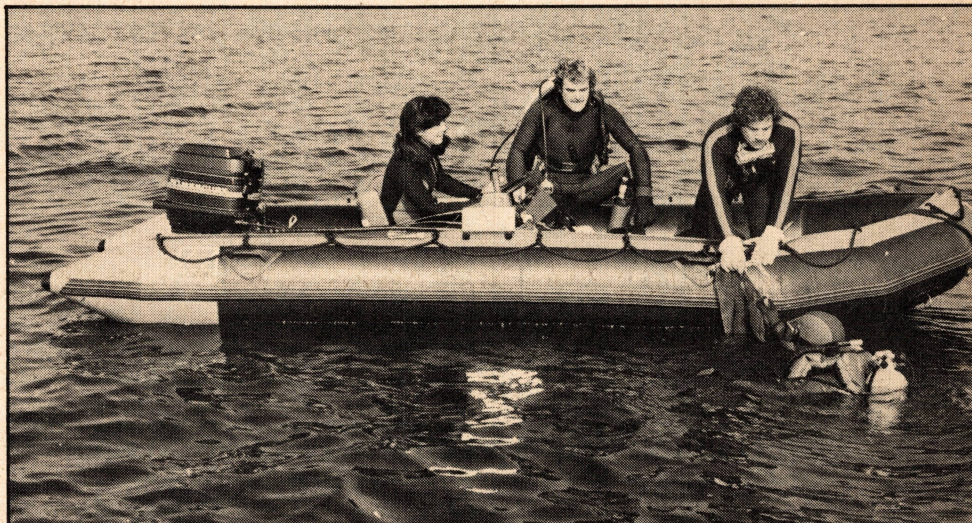
to make it bounce. I crossed our companion boat's wake at top speed, almost directly behind the other boat. The Futura seemed to cut right through the wake, just like a rigid boat of large size. But the most amazing part of the ride was its handling on turns. I couldn't get it to skid, even running flat out. I tried things I wouldn't try with any inflatable boat and with few rigid hulls, but the Futura took it in stride. The factory claims the boat will turn at top speed on a 16 foot radius. We had no means of measuring the turning circle, but it seemed to respond instantly to steering inputs.

Some of the credit for the Futura's handling should go to the optional rear mounted Bridge Command steering system. Designed by Scott McIntosh of Porta-Marine, Costa Mesa, California, the steering wheel and remote engine controls made it feel as though I were driving a 20 foot, rigid hull boat. The steering system, along with its padded seat, take up the interior space of two divers. But for long offshore trips it can make the difference between arriving fatigued and

MARK III FUTURA

ZODIAC MARK III FUTURA

Overall length	15'5"
Overall width	6'3"
Inside length	10'10"
Inside width	3'
Buoyancy tube diameters	1'8"
Shock tube diameters	4"
Weight	265 lbs.
Chambers	5 + keel + 2 shock tubes
Payload	2710 lbs.
Passengers	10, or 5-6 divers
Horsepower	65 max.
Floorboards	aluminum
Hull	nylon/Hypalon/neoprene
Color	black and red
Price	\$6,000



With its open bow and ten foot ten inch inside length, the Mark III Futura will carry six divers with full gear—seven without the remote steering system. With a 50 horsepower outboard the Futura is capable of nearly 40 miles per hour. For water-skiing, the boat can handle a 65 hp engine.

ti-splash vanes at the stern are connected to the shock absorbing tubes underneath by means of plastic hoses. The additional buoyancy provided by the tubes has allowed Zodiac to move the transom further back. This results in 18 inches more interior space than the conventional Mark III models, and nearly 300 pounds more carrying capacity. As a matter of fact, the Futura is longer inside, and carries nearly the weight of Zodiac's 17 foot six inch Mark IV Grand Raid.

Equipped with a 50 horsepower Mercury engine, the boat is capable of nearly 40 miles per hour. For water skiing it will accept an engine up to 65 horsepower. It can carry up to seven divers without the optional remote steering system.

All these virtues don't come cheap. The Mark III Futura lists at \$6,000. An engine, trailer and remote steering can bring the price as high as a sport car. But the Futura is a true offshore boat, which can safely make long trips in open water with the ride of a hard hull craft. At the present time, it represents the ultimate inflatable dive boat. 

bruised or being ready to go diving.

The Futura looks as good as it rides, all decked out in black, red and silver. The black tubes with red trim can feel like a branding iron, however, when climbing onto them in the heat of a Baja summer, clad only in your Speedo. I would cover them with light colored carpet for the sake of my backside.

The floorboards are anodized aluminum and self locking, as is the company's standard practice in its Grand Touring and Grand Raid models. Unlike the other Zodiac sportboats, the Futura has an open bow, which makes it look longer

than its 15 feet, five inches. This provides more storage space for dive gear. Two water resistant zip pouches are provided for storing things that should stay dry. For owners who want more spray protection, an optional cover is available which rolls back to the bow to become a bowdodger. However, the spray shielding provided by the rubbing strake and the hull design result in a dry riding boat which makes the cover unnecessary.

The Futura's five chambers are filled through Zodiac's patented interconnecting valves, made of a solid magnesium bronze alloy. Two valves on the an-

People are always trying to build a better mouse trap. It seemed to me that dive gear fell into this category, so I decided to share some of the equipment modifications I've made over the years. It has turned out to be many hours of creative fun for me, and you can do it too.

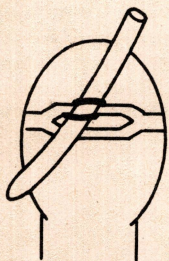
THE MASK

This is perhaps the most neglected piece of equipment in your dive bag, and a lot of divers take their masks for granted. Myself, I like to keep things simple and functional. Streamlining is a key factor for me. After you've been diving for awhile, you know how to adjust your mask so it feels comfortable. But what do you do with the ends of the strap? A little electrician's tape will secure these to the rest of the strap and prevent slipping.

SNORKEL

Most snorkels are tipped with a tape that provides high visibility during the day. But, if you do a lot of night diving, buy some reflector and glow-in-the-dark tape and tip your snorkels with these.

Attaching your snorkel to your mask is very much taken for granted. I've seen divers just tuck one under the mask strap and I've seen one literally "wired" to the strap. Since a lot of turbulence is created



as you propel yourself through the water, having your snorkel waving to and fro can be annoying. I attach my snorkel to the mask strap with a standard snorkel keeper, but instead of mounting it next to my temple, I've mounted the tip on the top part of the split section. This allows for less drag and more freedom of head movement. You'll also find you won't be gulping in as much water when you turn your head to either side.

FINS

Many popular fins in use today have heel straps. And, like the mask, the straps on the fins can slip. To prevent this, position the strap through the buckles so that the ends are on the inside (see diagram). Some electrician's tape around the straps near the buckles will further ensure no slippage.

I once asked this question of a neophyte diver: "What is worse than carrying an extra quart of water around with you when you exit the water?" The answer was, "Two quarts of water." He understood the question when he emptied the water from the foot pockets of his fins. We solved the problem later that day

CUSTOMIZE YOUR DIVE GEAR

BY JIM FAIX

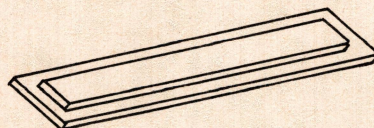
when we took a good sized nail, heated the end, and pierced two holes in each fin pocket. This also helps to pump out the sand from beach entries as you swim.

Another fin modification which is a great time saver: Put a pull tab on the fin strap. I made mine out of one inch wide nylon webbing, but it could be made from a short section of rope.

WETSUIT

With the possible exception of zipper replacement, just about any wetsuit modification can be made by the average person. Two of the most popular additions are pads and pockets. Knee pads and a spine pad are probably the most useful. Have a friend help you mark where you want your knee pads. Use 1/8 or 3/16 inch nylon two wetsuit material for these. After you cut the pads to shape, trim the edges to about 45 degrees and apply wetsuit glue to the edge also. This will give the pads a finished look. Be sure to follow the directions of the type of wetsuit adhesive you are using.

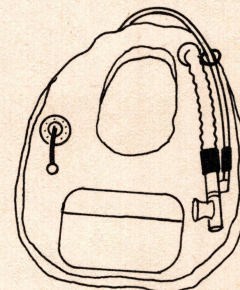
For a spine pad, take a second piece of wetsuit material and cut it two inches shorter and one inch narrower than the



actual pad strip. This will give body to your spine pad and help to displace more water along your spine. Remember to trim the edge of the spine pad to about 45 degrees for that nice smooth look. Pockets are applied in similar fashion, wherever you see fit.

BUOYANCY COMPENSATOR

One of the things that bothers me is seeing a diver (particularly myself) entangled in a disarray of hoses, gauges and



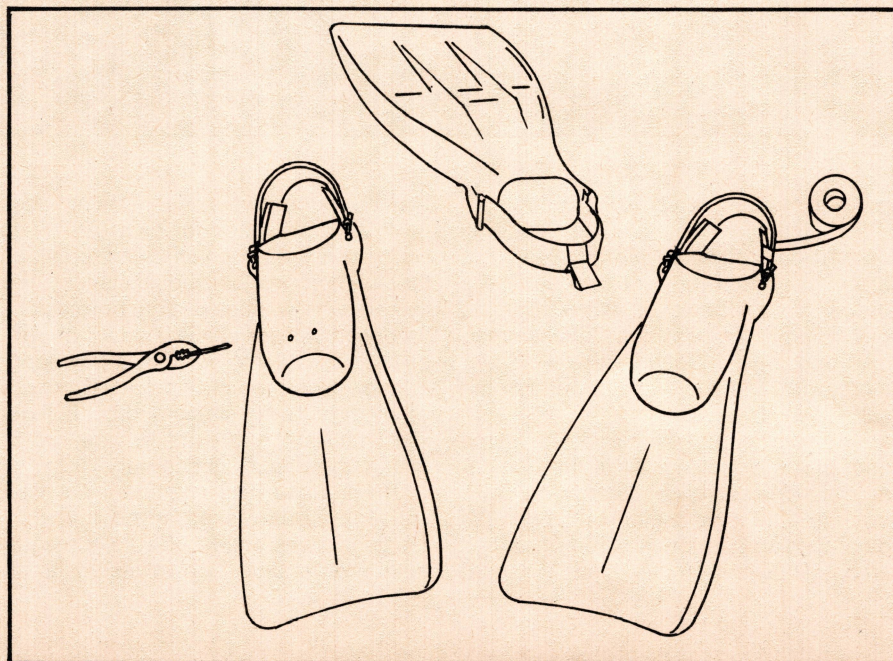
other dive paraphernalia. I've seen power inflator hoses going over the shoulder or under the arm. I believe I have solved this by adding a brass ring next to the BC hose elbow and routing the power inflator hose through this ring to the quick disconnect coupling. A Velcro band helps to hold the hose to the BC.

WEIGHTBELT

Many divers have a problem with weights slipping or even falling off their belts. Shown here are a few ways this problem can be overcome.



To carry larger accessories, you might consider adding spring clips or D-rings to your weightbelt. That is, of course, if you don't mind dropping the accessories along with your weightbelt in case of an emergency. Happy diving!



Scuba Quiz

Category: Repetitive Dives

By Dennis Graver

When making a series of dives, a number of rules, which do not pertain to a single dive come into effect. Is your knowledge of repetitive dive procedures and calculations current and complete? Now is the time to find out. Get a set of dive tables and try our quiz. Answers are on the following page. NOTE: Select all correct answers. Some questions have more than one correct response.

1. A repetitive dive is defined as any dive conducted within _____ hours of a previous dive.

- ☐ A. Eight
- ☐ B. 12
- ☐ C. 24
- ☐ D. None of the above

2. When planning a series of dives, the dives should progress from the _____ to the _____

- ☐ A. Shallowest, deepest
- ☐ B. Deepest, shallowest
- ☐ C. Longest, shortest
- ☐ D. Shortest, longest

3. Select the *incorrect* statement. If only one dive is made per day:

- ☐ A. It is not possible to get decompression sickness
- ☐ B. A safety decompression stop is unnecessary
- ☐ C. It is not necessary to reference the dive tables
- ☐ D. The rate of ascent is not critical

4. Short duration bounce dives should:

- ☐ A. Be treated as repetitive dives
- ☐ B. Be avoided owing to increased risk of decompression sickness
- ☐ C. Not exceed a depth of 60 feet
- ☐ D. Be made early in a day of diving

5. A surface interval is defined as the elapsed time between:

- ☐ A. Surfacing from one dive and descending for the next dive
- ☐ B. Beginning ascent from one dive and beginning descent for the next dive
- ☐ C. Surfacing from one dive and reaching the bottom on the next dive
- ☐ D. Leaving and entering the water between dives

6. Following a dive to 60 feet for 40 minutes, the minimum surface interval required to allow the dive to be repeated without decompression is:

- ☐ A. 2:00
- ☐ B. 2:58
- ☐ C. 2:59
- ☐ D. 4:25

7. When making the second dive in question number six, which of the following practices should be followed?

- ☐ A. Wait longer than the minimum required surface interval before making the dive
- ☐ B. Stay less than the maximum time allowed at the planned depth
- ☐ C. Make a safety decompression stop at ten feet for a few minutes at the end of the dive
- ☐ D. None of the above

8. When planning a repetitive dive and the residual nitrogen time exceeds the bottom time of the previous dive, recreational divers should:

- ☐ A. Use the actual bottom time instead of the residual nitrogen time
- ☐ B. Use the residual nitrogen time because it has a built-in safety factor
- ☐ C. Recalculate the tables to find where the error was made
- ☐ D. Refrain from diving for at least 12 hours

9. What is the maximum depth for a 30 minute no-decompression dive two hours after a dive to 80 feet for 22 minutes?

- ☐ A. 30 feet
- ☐ B. 50 feet
- ☐ C. 60 feet
- ☐ D. 70 feet

10. What is the maximum bottom time without decompression for the third dive in the following series of dives: 60 feet for 30 minutes, one hour surface interval; 50 feet for 30 minutes, 70 minutes surface interval; 45 feet.

- ☐ A. 34 minutes
- ☐ B. 44 minutes
- ☐ C. 53 minutes
- ☐ D. 127 minutes

Scuba Quiz

Answers: Repetitive Dives

1. B. 12 hours. This is the correct answer, however, studies have shown that there are body tissues with much longer halftimes than those on which the dive tables are based. Instead of assuming all nitrogen has been eliminated after 12 hours, divers—especially those who dive infrequently—should dive conservatively when on multi-day trips.

2. B. Deepest, shallowest. Body tissues which absorb nitrogen quickly at deeper depths will outgas at shallower depths, but slow-absorbing tissues—those affected more at medium depths—will continue accumulating nitrogen when the depth is increased. By diving progressively shallower on a series of dives, longer bottom times are possible and decompression sickness is less likely.

3. All statements are incorrect. It is certainly possible to get bent on one tank of air, so time and depth limits must be observed. A decompression stop is a good safety precaution for all dives of 50 feet or more. One should always know the no decompression limits for a dive, and should not attempt to recall the dive tables from memory. The ascent rate is very critical, and can cause decompression sickness even when a dive is made within the no decompression limits.

4. B. Be avoided owing to increased risk of decompression sickness. A fairly recent recommendation is to avoid surfacing during dives which are deeper than 40 feet. The physiological effects are not the same for a person descending three times to 100 feet with brief surface intervals as they are for someone who spends the entire time at that depth. The person who bounces up and down is forming bubbles and is a good candidate for decompression sickness.

5. A. Surfacing from one dive and descending for the next dive. One of the most commonly asked questions on a dive boat is, "What time did we come up?" Keeping track of surface intervals is important. Many boats use check out and check in times as a means of providing information for repetitive dive calculations. Even better is one of the new instruments which automatically keep track of both bottom time and surface intervals.

6. C. 2:59. A dive to 60 feet for 40 minutes places a diver in repetitive group G. To repeat the dive, a group designation of C is required. (This allows 43 minutes of bottom time without decompression.) The minimum surface interval required to attain group C from group G is two hours and 59 minutes.

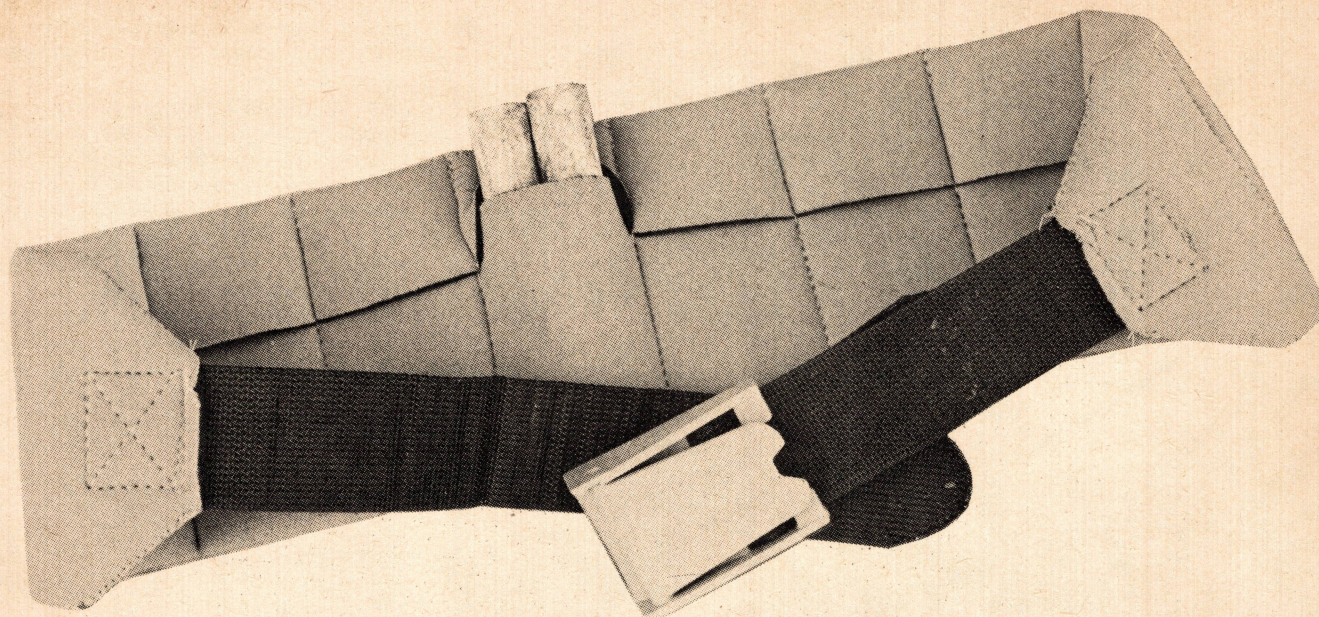
7. A, B, and C should all be followed. The rule, "Dive conservatively," is certainly appropriate for recreational divers. Maximum limits of the tables should not be approached. A safety stop for several minutes should be made at the end of each dive near the limits or beyond 50 feet, and the stop time should be added to the bottom time of the dive when determining the repetitive group designation.

8. Either A or B is correct, but B is recommended. U.S. Navy procedures state that when a repetitive dive is to the same or greater depth than the previous dive, the residual nitrogen time may be longer than the actual bottom time of the previous dive. In this event, the actual bottom time of the previous dive may be used as the residual nitrogen time for the repetitive dive. It is easier and safer to ignore this exception to the tables and use the standard residual nitrogen time figures provided.

9. Either C or D is correct, but C is recommended. A dive to 80 feet for 22 minutes results in a group F designation. After a two hour surface interval, the group designation is D. A group D diver is allowed 30 minutes at 70 feet without decompression, but this would push the tables to the limit. A safety factor is desirable, so it is better to limit the depth to 60 feet, where 36 minutes is the no decompression limit.

10. B. 44 minutes. A dive schedule of 60 feet for 30 minutes results in an F designation, and a one hour surface interval changes the repetitive group to E. A group I designation stems from the second dive, which has a total bottom time of 68 minutes. The 70 minute surface interval after the second dive allows the attainment of group G, and the 50 foot schedule for a group G diver allows 44 minutes without decompression. Again, this limit should not be pushed, and a decompression safety stop should certainly be made.

Did you note some differences between the textbook method of calculating repetitive dives and the way it should actually be done for safe diving? The number one rule to avoid decompression sickness, with its pain, discomfort and injury, is to always allow a margin of safety in repetitive diving. Also, pay close attention to ascent rates. The typical recreational diver ascends at more than twice the proper rate!



FOAM NEOPRENE

Nobody loves a weightbelt. It's something divers accept as a necessary evil. It's a bulky, uncomfortable, inconvenient piece of equipment that has changed little over the last 25 years. But Scubapro's engineers have taken a long, hard look at the weightbelt, and developed a new concept which overcomes many drawbacks of the old designs.

Let us look at some of the problems of conventional weightbelts, and then examine Scubapro's solutions. First, it's a hassle to change the amount of weight to compensate for a deeper dive or a different wetsuit, especially if you have taken measures to prevent weight shifting. Then, the belt loosens as your wetsuit compresses at depth, which could allow the buckle to slide behind your back. The only cure is to cinch it so tight you can barely breathe, then tighten it some more as you go down. Next, the bare weights bang against your tank, dig into your hips, and ding the pool bottom when used there for training. Finally, the steel buckle is difficult to adjust, and can become distorted, allowing the belt to slip open underwater.

Scubapro's new Bandolera weightbelt overcomes all these problems. Its body is constructed of one-eighth inch foam neoprene, divided into pockets with overlapping closures. Each pocket will accept a cylindrical weight up to two and one-half pounds. The small belts hold up to 20 pounds of weight, while the longer standard ones accept up to 25 pounds. Firmly enclosed in

SCUBAPRO'S BODY BUDDY BANDOLERA

TEXT AND PHOTOGRAPHY
BY ERIC HANAUER

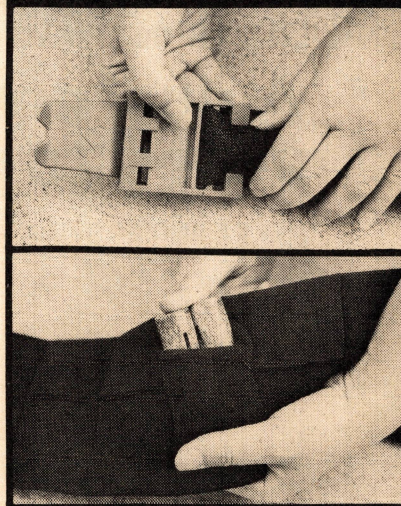
the pockets, the weights cannot slip and are easily removed and replaced. Distribution of weight all around the body is more comfortable, especially when walking. The neoprene rubber protects tender hip bones, and pool bottoms. This feature will be especially appreciated in warm water, when the diver isn't wearing a wetsuit.

More than six inches of stretch is provided by the neoprene. Just snug up the belt at the beginning of the dive, and it does the rest. Scubapro engineer, Jim Dexter, considers this the outstanding feature for skin diving. "It will compensate for the drastic changes in abdominal diameter on deep breath-hold dives," he states.

The Bandolera's buckle deserves some attention. It is made from glass reinforced nylon and can't bend like stainless steel buckles. Its patented inner adjustment device is much quicker and easier than the old method of weaving the belt material in and out through several slots. For rental and instructional applications, this is a big plus. In keeping with standard Scubapro practice, the weightbelt buckle is notched so it can't be confused with the buckle on the tank harness. Finally, it has a positive snap when tightened. It is very unlikely that

WEIGHTBELT

The new Scubapro weightbelt is made of neoprene rubber and has pockets that hold weights of up to 2½ pounds. The weightbelt comes in two colors and two sizes.



this buckle will open accidentally, yet it responds easily and quickly when the diver pulls the release tab.

Only a period of extended use will tell how well the neoprene body will wear. Small tears can be repaired by the diver the same way as he or she would repair a wetsuit.

The Bandolera is available in two sizes: standard (ten weight pockets) and small (eight pockets). Both come in orange or black, with an orange buckle. The price is \$26 at your Scubapro dealer. No weightbelt is lovable, but this one comes close. 

DIVE BOATS



Grady-White 223 TOURNAMENT

A dual console boat destined to please divers

TEXT AND PHOTOGRAPHY BY STEVE LUCAS

From the instant our SKIN DIVER test team spotted the 223 Tournament, we knew we had a winner. Few manufacturers actually set out to create a dive boat, and Grady-White probably wasn't thinking of sport divers when they laid out this dual console model, either. Whether by planning or providence, this boat is destined to find itself very popular with divers. With an overall length of 22 feet, this clean hull can easily take a half dozen divers out to any reef.

Our immediate praise for the overall interior design was unanimous. Not one inch of this fiberglass beauty is wasted. The design is as close to an underwater photographer's boat as any built. The storage in the dual consoles offers so much padded, dry protection you could carry two or three bulky camera cases onboard and hide them out of reach of

the salt spray. But, storage is not limited to the large lockers inside each console. In the bow section there is an anchor locker under the forward seat and a storage locker in the deck. Although shallow, they are large enough to store small gear, or mask and fins. Behind each of the two console swivel seats are insulated boxes which can be used for dry storage or beverages. Grady-White meant these to be used as storage for a fisherman's catch. If you plan to use the boat for purposes other than diving you will find multiple uses for these. On each aft gunwale there are more baitwells, easily usable for additional gear storage.

In the bow section, just forward of each console, are two corner seats. These areas are just large enough to set a tank down and sit in front of it. The wall of each console, combined with the gun-

The wide beam of the 223 Tournament provides stability and the fold-down motor well bulkhead or splashwell allows unobstructed access to boarding divers.

wale, keeps the tank from falling. Once strapped in you do not have to walk anywhere to get out of the boat. Simply stand, sit on the gunwale and do a backward roll over the side! Every dive boat should be so easy to gear up in.

Re-entry is just as simple since there are no obstacles to climb over. The motor well bulkhead, or splashwell, simply folds down when necessary. When down the entire aft section becomes wide open and usable for the standard amount of gear that gets spread around the deck. Our test model was equipped with a small half platform with a single step, tubular ladder. We do recommend you order a more substantial platform and ladder assembly since the weight of dive equipment will make this somewhat difficult to use when climbing aboard.

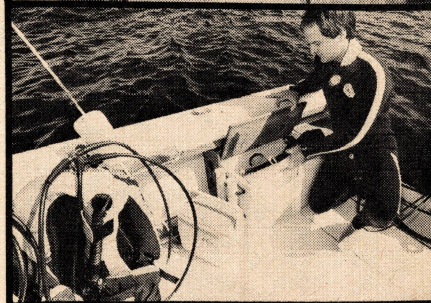
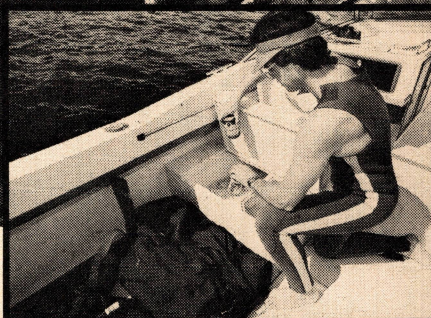
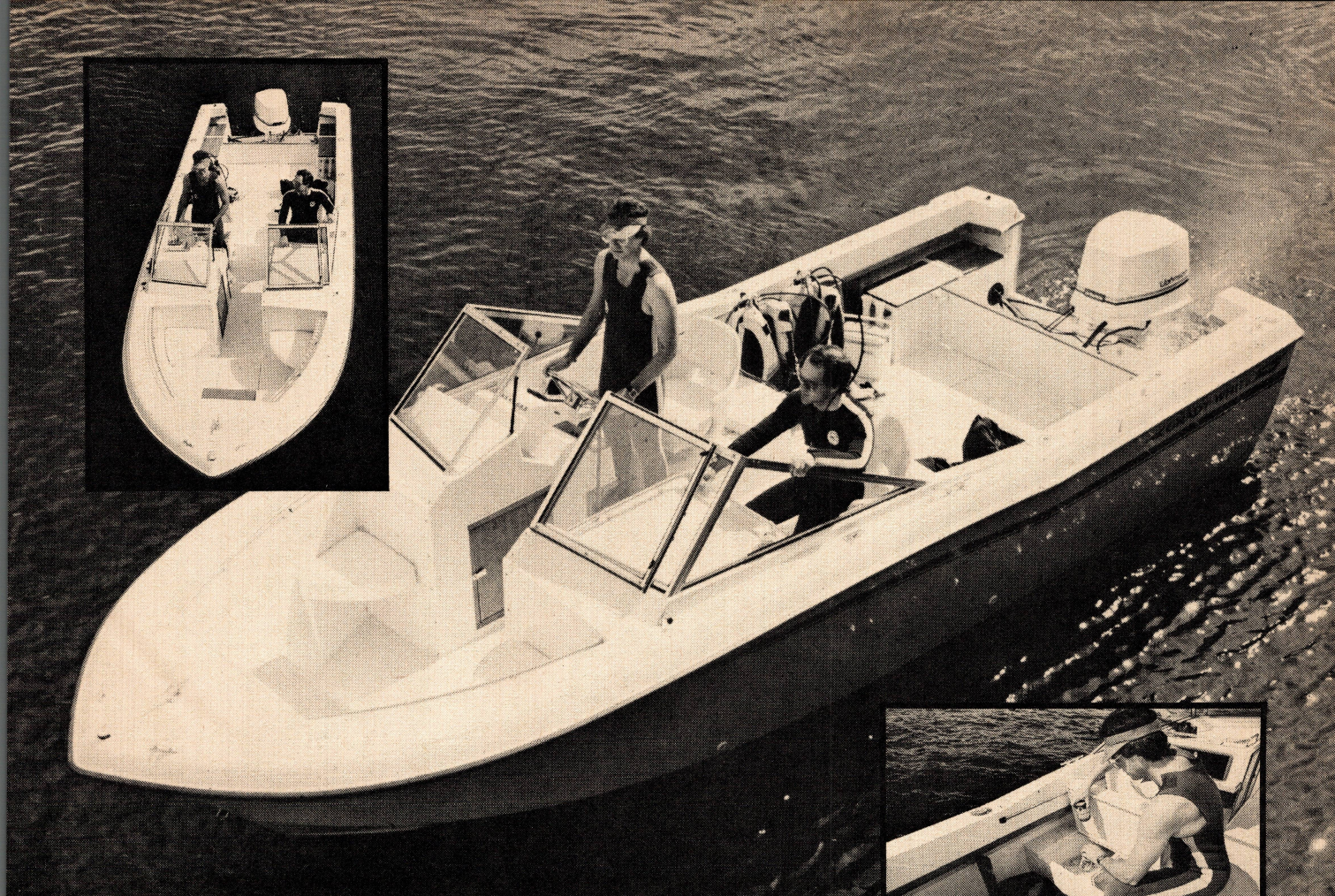
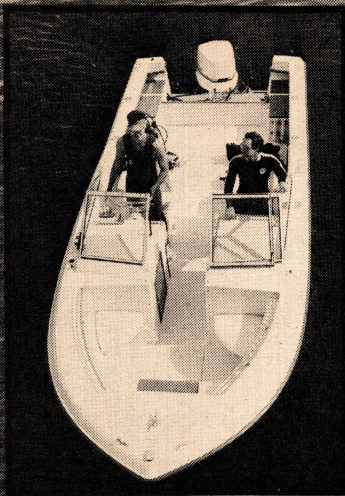
Grady-White is one of the oldest manufacturers in the business and known for the care and concern taken for their molds. The result of this concern is reflected in fine craftsmanship. The glass work is among the best we have seen. Wall thickness is substantial and the hull is absolutely free of ripples, stress cracks, or flaws. With the company's attention to detail, even the screw heads are all in line.

Another interesting and unusual design feature is the beam of the vessel; a full eight feet that does not taper off drastically aft. At the stern it is only four inches narrower than amidship. According to Mike Middleton at Pompano Beach Marine Center in Pompano Beach, Florida, supplier of our test boat, this not only provides additional roominess, but also provides better stability.

Another stability feature is the use of a modified deep-V design. The keel changes from a V to a rounded bottom as it runs fore to aft. The result is less listing when running in a crossing sea. The bottom also has an extremely sharp chine (the lip where the outside hull wall turns underneath the boat). The chine stops most of the spray from getting off the water's surface and into the boat.

Although most divers will find the 223 Tournament outboard model, as provided for our tests, more than adequate for their needs, the hull is available in two other models. The 224 Tournament is equipped with an inboard/outboard and the 225 Tournament has SeaDrive power. If 22 feet is not quite enough or just a bit too much boat there are nearly identical 24 and 19 foot models. Grady-White models are also available with walk-around or cuddy cabins.

The Grady-White catalogue lists some



37 standard features that are notable. Those that dive boat owners will find especially practical include: 1) full non-skid surfaces on the entire inner liner, 2) marinium and stainless steel hardware, 3) lockable glove box and radio box/instrument panel, 4) self-bailing cockpit, 5) international running lights, 6) automatic bilge pump, and 7) a 93 gallon aluminum gas tank. Equipped with a Johnson 175, like our test boat, this should provide over ten hours of cruising at normal speeds—substantial fuel capacity indeed, but if that is not enough you can order the additional optional 40 gallon tank. Other options that will make your cruising more comfortable are a portable head, tuna tower and spray hood with top and side curtains and drop curtains fore and aft.

The 223 Tournament carries a base price of \$12,700, which reflects its quality. Fully rigged with the Johnson 175 and other features usable by divers you could expect to spend approximately \$21,000 excluding trailer. Grady-White's dealer network is extensive and you can receive the company's full color catalogue and the name of a dealer near you by calling (919) 752-2111 or writing: Grady-White Boats, P.O. Box 1527, Dept. B (SDM), Greenville, NC 27834. 🌿

The twin console design and open deck area of the boat allow room for divers and equipment. Storage compartments are found throughout the vessel, with padded, dry storage in each console. Insulated boxes behind each swivel seat can be used for dry storage or for beverages.

223 TOURNAMENT OUTBOARD

Length.....	22'
Beam.....	8'
Transom height	25"
Transom width.....	94"
Hull draft.....	14"
Maximum horsepower	260
Weight.....	2600 lbs.
Price	\$12,700 (base)

TEXT AND PHOTOGRAPHY BY FRED FISCHER

Spearfishermen who want to get that second shot off fast or who have suffered the pain of a broken wishbone during loading may want to take a long look at a pneumatic speargun. The benefits of the air-spring gun, including the exceptional accuracy, may easily compensate for the larger initial cash investment. The choice of the right gun then depends on the size and type of fish being sought.

Cressi-sub of Italy produces no less than 13 pneumatic guns as well as three rubber band models. The lighter weight SL-70 is the most popular of the line because most fish taken for dinner, despite what may be said, are not giants.

The SL-70 body has the grip at the very end and measures only 30 inches. It ejects a 31 inch (including tip) harpoon. The 8 mm shaft is threaded for 7 mm spearpoints and made from cadmium plated steel, although stainless steel shafts are available optionally. A low power setting is incorporated into the design for easier loading. The range of the gun is set by the eight foot shock cord. Included with the gun is an air pump for adjusting the pressure in the air chamber, a plastic hand loader and a yellow vinyl carrying case.

The design of a pneumatic speargun requires rather strict tolerances and quality craftsmanship, all of which are apparent in the Cressi speargun. Buoyancy is carefully adjusted so the gun sinks with the shaft in place, but floats after discharge for easier retrieval.

The barrel is made from black anodized aluminum with a tough nylon handle attached at one end. The black shock cord is 3/32 inch braided nylon, stiff enough to be easily wrapped underwater.

Surprisingly, no elastic section is included in the line to aid in loading. The spearfisherman may want to add this feature. However, if length of the cord is properly set the modification is not necessary.

The safety is directly above the trigger and is actuated by pushing it from side to side with the thumb and index finger. No indication is given as to the status of the safety so the diver may want to color code it himself. The power selector is on the left side of the handle behind the trigger for easy actuation by thumb. The rear cord release protrudes from the bottom of the trigger loop and is not in the way of left or right handers. There is a sighting rib along the top to the muzzle.

The plunger, or air-spring, is backed by a double air chamber which should normally be filled to 18-20 atmospheres pressure. A slightly lower pressure can be used for short range shots or when you just don't have the strength that day to load a fully pressurized gun. Higher pressures should be used for greater range or on deep dives to overcome the three to five atmosphere loss in power at depth. Internal pressure is released through a valve at the back of the SL-70. It is increased by pumping air through the same valve using the hand pump provided. All of this, of course, is part of the pre-dive preparation.

Loading the SL-70 can be done smoothly and quickly with practice. The safety is first set to on, the power switched to low and the tail end of the shaft is pressed into the muzzle. The back of the grip is then positioned on top of one foot. The shaft is pushed into the barrel with the opposite arm, using the hand loader until the trigger is engaged.

The muzzle must be steadied with the other hand to avoid bending the shaft. If you fail to push the shaft all the way home on the first try, the second attempt will be easier owing to the double air chamber design. After wrapping the shock cord and switching the power to high, the SL-70 is ready.

The gun is unloaded by firing it into open water away from rocks and other divers. Unlike rubber band guns, there is no place to store the shaft in the disarmed condition. Many spearfishermen simply wrap the shaft next to the barrel with the shock cord. The hand loader can be attached to one wrist with a lanyard.

Good maintenance of the SL-70 is simple, but absolutely necessary. Sand must be removed from the muzzle at once to avoid scratching the plunger seals. After diving rinse the gun with fresh water and store it with the muzzle down. If the gun is used often Cressi-sub recommends that special lubricating oil be added to the air chamber occasionally. Bent shafts should never be used. Firing the SL-70 out of water will ruin the plunger. To discharge the gun out of water press the tip against the ground or a corner where the wall meets the floor and pull the trigger while holding on tightly to the barrel and handle. All repair problems should be directed to a local Cressi-sub dealer or the repair station in Miami, Florida. Be sure to include a letter which fully describes the problem that you are having.

To see all of the Cressi-sub spearguns, speartips and accessories, visit your local Cressi-sub dealer. The SL-70, which is available for a suggested retail price of \$176, may be the key to improving the efficiency of your spearfishing.

CRESSI-SUB SL-70

An efficient and popular pneumatic gun



The SL-70 comes with pump, loader and case.

Power selector (silver) and safety.

Australia

SDM 1983 SPECIAL SUPPLEMENT

**"A vast galaxy of coral reefs,
drop-offs, and bizarre marine
creatures in a southern sea"**





Australia

Text and Photography by Geri Murphy

If one were to attempt to sum up Australia in one word, that word might be *awesome*. It is a country of enormous proportions and staggering beauty.

Australia is the largest island on earth and could almost be catalogued as a continent. It covers an area the size of the United States, but has a population of only 14 million people. Lying off its northeast coast is the Great Barrier Reef, the world's largest coral reef. Measuring 1250 miles in length and 40 miles wide, this remarkable structure is sometimes described as "the world's largest living thing." Beyond the Barrier Reef is the immense expanse of the Coral Sea, a vast, unspoiled ocean of thriving coral reefs and islands, the size of the entire Caribbean.

Yet, Australia's awesome expanse is not the main reason for its attraction to divers. This land at the bottom of the globe offers a special fascination to underwater explorers, for it is populated by some of the most bizarre marine creatures imaginable. Only in Australia can you find the whiskered face wobbegong, cuddle a 150 pound grouper, or photograph 30 different species of nudibranchs in one day. Schooling manta rays, tree-size seafans, rainbow colored crinoids and spectacular soft corals are common sights on the Barrier Reef. These are the reasons divers are willing to travel halfway around the world.



Bait Reef

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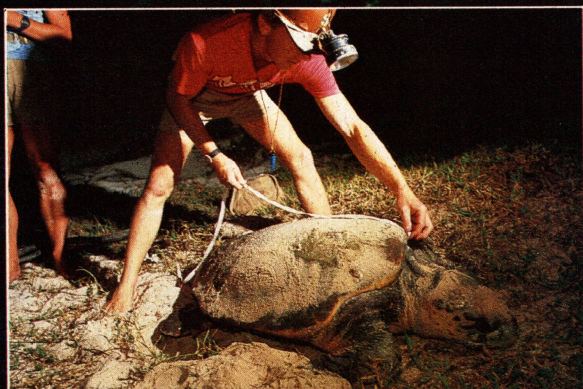
land of exotic dive adventure



Heron Island



Hayman Island



Heron Island



Hayman Island

Australia

LOCATION

Australia is across the Pacific Ocean on a diagonal line from the U.S. It is south of the equator and west of the international date line. When it is Tuesday in the U.S., it is already Wednesday morning in Australia. The flight distance from Los Angeles to Sydney is almost 7500 miles and close to 10,000 miles from New York.

FLIGHTS

There are a number of international air carriers which operate direct flights from the U.S. to Australia on a daily basis. Most of them utilize 747 jumbo jets for these long range routes. The best known is Qantas, Australia's official airline carrier. The planes are run by all-Australian crews and the service is both friendly and efficient. Qantas operates daily flights from San Francisco to Sydney and flights three times weekly from Los Angeles to Sydney. The flight time from the U.S. to Australia is approximately 16 hours, including a fuel stop at Honolulu or Tahiti. The most recent addition to the Qantas service is direct flights from the U.S. to Townsville, a seaport city right on the Queensland Coast. Divers can now fly directly into the Great Barrier Reef area, for immediate departure on one of the live-aboard dive boats that cruise the Great Barrier Reef or Coral Sea.

CUSTOMS/IMMIGRATIONS

To visit Australia, you must have a current passport. Birth certificates and voter registration cards are not acceptable. Prior to departure you must also obtain an Australian Visitor's Visa. This should be done three to four weeks ahead of time. You can obtain an application form from the Australian Consulate-General who has offices in San Francisco, Los Angeles, New York, Chicago, Honolulu and Washington, D.C. The completed form must be returned to the Consulate-General's Office along with a passport photo, your valid passport and a self-addressed return envelope. There is no charge for the visa itself. Allow 21 days for processing and return by mail. If you are in a hurry, you can visit the Consulate-General's Office in person and obtain the visa within three to four days.

CURRENCY

Australia has the same currency structure as the U.S., but its dollar is worth more than ours. The present currency exchange rate is \$1 Australian to \$1.11 U.S., but this rate can fluctuate. You can obtain a little Australian spending money at the San Francisco or Los Angeles air-

ports prior to departure or at any bank in Australia.

ELECTRICITY

The Australian electrical system is basically 220 to 240 volts on 50 cycles AC. The electrical outlets are designed to accept a two or three pin plug that has flat blades in a V-configuration. These outlets will not accept an American made plug. If you are planning to bring along any U.S. made appliances (110 volts) you will need to obtain an adapter plug and a voltage converter. These can be obtained at luggage and hardware stores.

DINING

Australians have the same basic diets as Americans and most dishes are quite familiar. Australia also offers a wide range of ethnic restaurants which serve delicious Italian, French, Japanese and Chinese food.

Australia has some of the most stringent health and food regulations to be found anywhere in the world. You can drink a glass of water direct from the tap without worry. Fresh fish and other seafood are abundant. Beef and lamb are exquisite and Australian wines compare favorably with good California and European brands.

WEATHER

Because Australia lies south of the equator, the seasons are the reverse of ours. Spring runs from September to November and summer is from December through February. The Australian fall is from March to May and winter is from June to August.

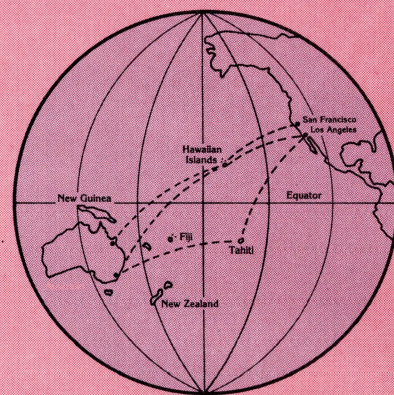
As far as weather on the Great Barrier Reef is concerned, it is eternal spring and summer. The Queensland Coast and adjacent Great Barrier Reef are in the northeast part of Australia, close to the equator. The climate is very similar to that of the Florida Keys and the Caribbean.

GETTING AROUND

The arrival of your trans-Pacific flight to Australia is not the end of your travels but merely the completion of the first leg. If you land in Sydney, it's still a long way to the Queensland Coast and the dive areas. It is a little bit like landing in New York and wanting to make a dive in the Florida Keys. Most of the dive areas are 700 to 900 miles distant.

The best way to get around Australia is by air. There are two excellent internal airlines which offer a wide network of inter-city flights to all locations along the Queensland Coast. Trans-Australian Airlines (TAA) and Ansett Airlines are both modern, efficient systems that operate non-stop jet service between the larger cities and smaller propeller aircraft to the coastal towns. In addition to the two major airlines, there is Air Queensland Com-

muter Service which operates to most cities in Queensland, including direct flights to Lizard Island. Another excellent commuter service is Air Whitsunday, which operates flights from the Australian mainland to both South Molle Island and Hayman Island, as well as seaplane flights to the Great Barrier Reef. Getting around Australia is quite easy since everyone speaks English and is eager to provide assistance and travel directions. The airport system is pretty much the same as it is here in the U.S. and most Americans can find their way around with a minimal amount of direction. One of the most delightful aspects of Australia travel is the courteous and friendly service provided by the taxi drivers. These affable fellows are always quick to strike up a conversation and tell you as much as possible about their country.



Australia is in the southern hemisphere, west of the international date line, diagonally across the Pacific from N. America.



Qantas is the international flag carrier for Australia, with 747 flights around the world, including direct service to San Francisco and Los Angeles in the U.S.

DIVE SCENE

Because of the immense size of the country and differing geographic zones, the dive scene in Australia is somewhat complex and vacationing divers must be careful to select the right kind of services. There are basically three types of diving in Australia; local, tourist, and experienced resort.

The majority of Australia's local diving is centered around Sydney and Melbourne, the two large population centers

Dive Down Under: \$882.

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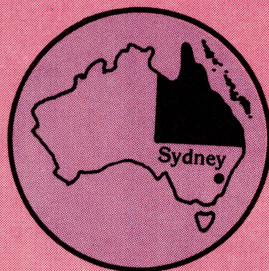
QANTAS

The Australian Airline.

**"I've got a
sinking
feeling
that fare's
going to
be entirely
too
popular."**



Australia Dive Scene



The Barrier Reef and Coral Sea are off Queensland in the NE corner of Australia.

at the south end of the country. Dive conditions in these areas are similar to California or New Jersey. The waters are cool, visibility is limited and much of the activity is underwater game hunting. The conditions are really not suitable for vacationing divers. Amazingly enough, most of Australia's local divers have never been on any of the live-aboard dive cruises along the Great Barrier Reef or into the Coral Sea.

Tourist diving activity is centered along the Queensland Coast where just about every fishing boat, glassbottom boat and seaside hotel offers some form of snorkeling or reef trips. These activities are primarily for non-diving tourists who are seeking a little bit of thrill on their Australian vacation.

For experienced dives willing to spend the time and money to travel clear across the Pacific, there are specialized services. Australia is rapidly developing an international resort diving industry which includes specially designed live-aboard dive boats, highly experienced guides, offshore island resorts and the most modern equipment available.

RESORT DIVING

There are basically three types of resort diving vacations available to international visitors. The first is a stay at one of Australia's four offshore islands, which offer complete scuba facilities. Heron, South Molle, Hayman and Lizard Islands are all land-based resorts which have scuba facilities on the premises and daily trips to both the nearby reefs and the more spectacular locations along the outer edge of the Great Barrier Reef. The advantages of an island based resort include roomy accommodations, hot water showers and a variety of sport activities and, in the evening, entertainment.

The second type of dive vacation is a cruise along the outer edge of the Great Barrier Reef on one of the many specially built live-aboard boats. These vessels operate out of such seaports as Townsville and Cairns, making five to ten day cruises and covering distances of up to 300 miles.

The third and most exotic type of dive vacation is an extended cruise into the Coral Sea on one of the long range live-aboard boats. These cruises provide a

real opportunity to visit a series of virgin coral reefs and uninhabited islands 50 to 250 miles beyond the Great Barrier Reef. It is a spectacular experience.

BOOKING TRIPS

Because much of the best diving is done from live-aboard boats which have limited accommodations, the Australians have developed a fairly unique system for international visitors. Designed and developed by Australian diver David Loughnan, this system efficiently funnels reservations through the two offices of Dive In Australia which are in Sydney and San Francisco. As the worldwide sales representative for most of Australia's best dive

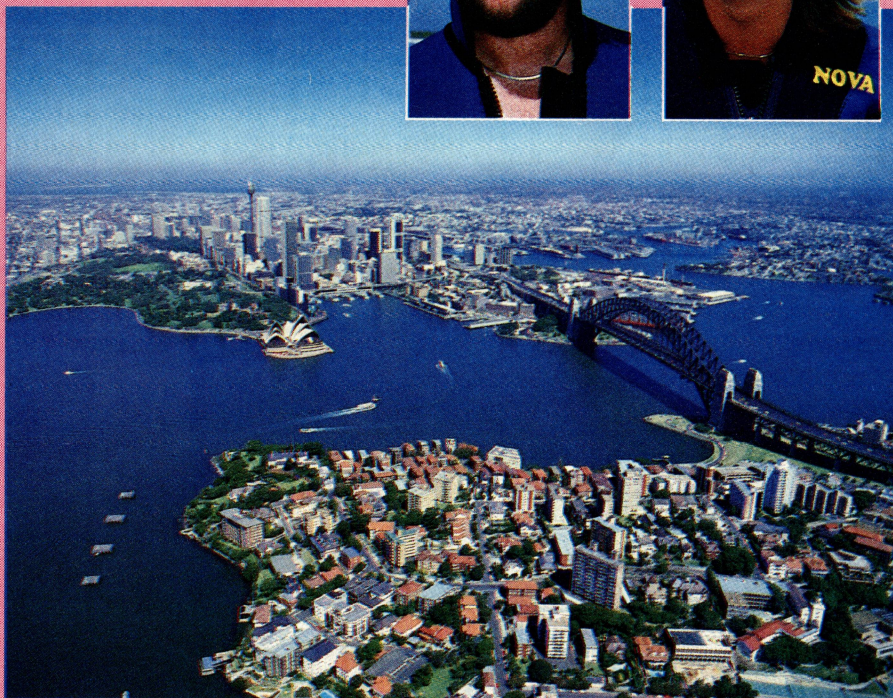
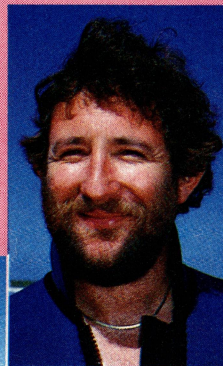
operations, Dive In Australia coordinates booking dates and itineraries with various live-aboard boats and island resorts. The Sydney office is under the general management of Sally Bennett, an experienced diver. The San Francisco office is operated by Toni Gleim, also a diver.

Dive In Australia in turn works with various travel wholesalers and dive shops in the U.S. Its main operators for this part of the world are See & Sea Travel and Sea Sports, Inc.

David Loughnan, president of Dive In Australia, is quite a colorful character with a large repertoire of jokes and fascinating tales of Australian dive adventures. Serving as Australia's unofficial ambassador of diving, David spends much of his time touring the U.S., giving lectures and film presentations on the underwater attractions of the Great Barrier Reef and Coral Sea.

This year, Loughnan is conducting a city-to-city tour of 12 different locations throughout the U.S. presenting Stan Waterman's new Australian diving film plus his own very humorous slide presentation. Dive stores and dive clubs can obtain information on his presentation by calling Toni Gleim, Dive In Australia, (405) 928-4480.

David Loughnan is president of Dive In Australia and Sally Bennett is general manager. The firm's head offices are in the modern, cosmopolitan city of Sydney. Dive In Australia coordinates booking for the live-aboard dive boats and island resorts in the Great Barrier Reef.



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Heron Island

Heron Island is probably the most unusual dive resort in the world. It sits in the center of a 50 square mile national marine park comprised of 16 coral atolls, islands and living reefs. Heron is the only one that is inhabited. Heron itself is part of the park, serving as a bird sanctuary and turtle nesting ground. Heron's visitors have a rare opportunity to live on a tropical island that is part of the Great Barrier Reef system while enjoying the basic comforts of a vacation resort.

A tiny speck in a giant ocean, Heron is barely one-third of a mile long and only 330 yards wide. It is basically a coral cay covered with trees and brush and ringed by a white sand beach. The highest point is only 13 feet above sea level.

One small corner of this island is occupied by the resort, the remaining island is a wilderness refuge for 40,000 seabirds and at least six species of turtles.

Surrounding Heron Island is a vast city of coral reef structures which has built up over the last 18 million years. The island is but a tiny portion of a huge double reef system that stretches for miles. You can actually walk on the top of this reef during low tide, visiting hundreds of intriguing tide pools, crevices and tidal channels.

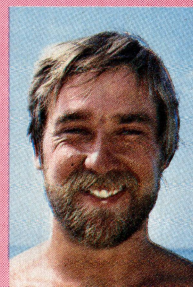
LOCATION

Heron Island is near the southern end of the Great Barrier Reef. It lies 50 miles off the Queensland Coast, right on the tropic of Capricorn. The climate is perpetual summer with temperatures ranging between 75 and 90°F. And, the outer edge of the Great Barrier Reef is only 12 miles away.

GETTING THERE

To visit Heron Island you must first travel to Gladstone, a seacoast city opposite the island. From Sydney you can fly north aboard TAA of Ansett to Brisbane, change planes and continue your flight along the coast to Gladstone. From Townsville, you can fly south to Gladstone aboard Air Queensland.

At the Gladstone airport you then transfer to Lloyd Helicopter Service. This airline operates all day long and has four helicopters which can carry four to six persons per flight. You fly the last 50 miles in 30 minutes while skimming the Barrier Reef at an altitude of 1500 feet. The view is breathtaking—be sure to take your camera!



Clockwise from top left: An aerial view of Heron Island. Heron Island Helicopter Service flies four passenger Jet Rangers from Gladstone. The new deluxe suites at the Heron Island Resort. Heron Island divemaster Ian Daulby. American visitors find it easy to "phone home" from the seemingly world-away Heron Island.

THE RESORT

Heron Island Resort is certainly not fancy but it is comfortable and clean. It is sort of a cross between summer camp and the parrot jungle zoo. The resort has a tropical village atmosphere: its 35 small buildings are scattered among the trees. Footpaths or narrow roads connect all of the buildings and guests walk everywhere. There are no cars, trucks or motorcycles and the only form of transportation is the tractors used for hauling luggage, scuba tanks and boat launching.

The resort has 70 rooms and suites which can accommodate up to 230 guests and yet the resort never appears crowded. The only time you ever see everyone is at mealtime when guests congregate in the giant dining room. The meals are delicious. Breakfast and lunch are served buffet style with fresh fruits, vegetables, meats and fish.

Recreational facilities include a large freshwater swimming pool, game room, a cocktail lounge, a dance area and a tennis court. Special activities include

walking tours which cover more than one-half mile of the reef. Guests are provided with tennis shoes and walking sticks. There are also guided bird watching tours during which guests learn about the 20 different species of birds which live on Heron. From October to March there are turtle watching tours and guests have an opportunity to see these magnificent reptiles lay their eggs.

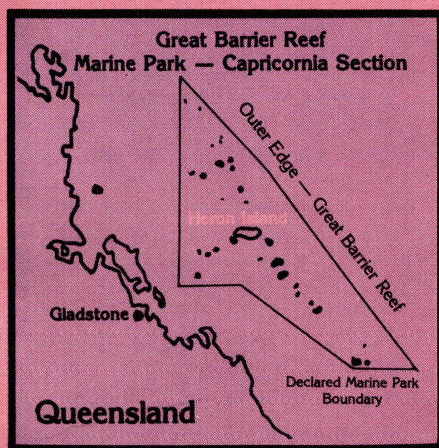
DIVE FACILITY

Heron Island Resort has an extensive dive shop right on the premises. It consists of an air station with three heavy-duty air compressors, an inventory of 60 or more rental scuba tanks, a fleet of four dive boats and a well stocked sales department. There are four dive guides who operate the boats, fill tanks and escort guests on reef tours.

The primary boats used for daily trips to nearby reefs are two 34 foot customs with extra wide beams. These will carry 24 divers each. Snorkelers and scuba divers ride on the same vessel as shallow



Heron Island guests enjoy the rare privilege of watching a sea turtle lay her eggs.



reefs and deep dives are equally accessible at most sites. A 26 foot dive barge with a front drop ramp is used to accommodate smaller groups. A 23 foot Shark Cat, a twin-hulled, high speed craft, can carry up to 12 divers.

Heron Island caters basically to experienced scuba divers and to snorkelers. There are no basic classes offered and visiting divers must be certified or content to snorkel only. U.S. certification cards are recognized here.

The Heron Island dive shop operates two scheduled scuba dives daily. Each is a one tank dive followed by snorkeling and free diving. The morning dive departs at 9:20 am and returns before lunch. The afternoon dive departs at 2:20 pm and returns in the late afternoon. Arrangements can be made for a full day, two tank trip to the outer Barrier Reef.

HERON REEFS

At Heron you will find the most beautiful nudibranchs imaginable and the dive guides will show you one after another during dives. In the months of June and July, manta rays by the dozens can be seen cruising along the reefs, often coming very close to the divers. The coral reefs of Heron Island are so exquisite and so unusual that the government declared

this area a marine park in 1979. The entire area is under the supervision and protection of the Great Barrier Reef Marine Park Authority. Coral collecting and commercial spearfishing are prohibited and the law is strictly enforced.

Because Heron Island lies inside the edge of the Barrier Reef, visibility is not as crystalline as it is on the outside edge or the Coral Sea. Visibility averages 60 feet but varies from a low of 40 feet to a high of 100 feet plus. An enormous amount of nutrients are carried with each tide, feeding the living coral polyps and small marine life that inhabit these reefs. Heron's reefs are a bonanza for those interested in macro photography or fish

close-ups.

Many of the best dive sites around Heron Island are only a 5 to 15 minute boat ride from the beach. This is almost like taking a bus to the park. The boat anchors close to the shallow portion of the reef so that snorkelers can drift over the coral gardens while divers explore the lower portions.

Among the best dive sites around Heron Island, **Big Bommie** would be regarded as the most popular. This consists of six giant coral heads which rise up 30 feet from a sloping bottom. The uppermost coral head is loaded with tons of fish which are extremely tame. A school of batfish circles the top while moray

DOCTORFISH



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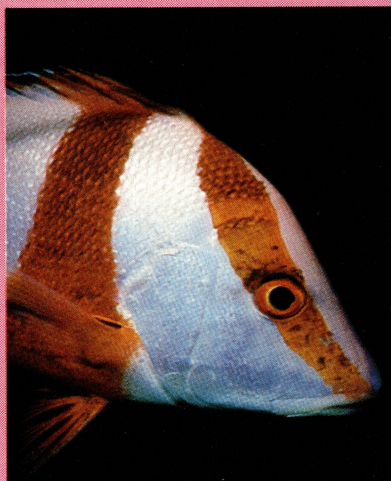
**Human Underwater Biology, Inc., P.O. Box 5893, Dept. BR,
San Antonio, TX 78201. 521 492-9395.**

Heron Island

eels, groupers and snappers pose patiently for pictures and tidbits.

Another fascinating dive site is **Blue Pool**, a semi-circular indentation in a straight coral reef. Apparently this was once a completely round tide pool but one side broke away during a storm. The depth in the pool averages 30 feet, with the sides rising vertically to the surface. Beyond the pool, the bottom slopes gently down to a depth of 60 feet. The site is loaded with schools of snapper, giant batfish, lots of small grouper and hundreds of anemone clownfish.

Another favorite is **Gorgonian Hole** which features a broken coral wall and high coral heads in deeper water. Depths range from 10 to 40 feet and the place is loaded with orange gorgonian fans, small soft corals, Spanish dancers and giant nudibranchs. It is also a great spot for finding scorpionfish, painted lobster, featherstars and beautiful angelfish. Other excellent dive spots include: **Wistari I, Cliffs, Canyons, Pam's Point** and **Hole**



The red emperor is a typical example of the exotic fish life found at Heron Island. Feeding large moray eels is a daily ritual at this fine tropical resort.

in the Wall. A map showing all of the dive locations is available at the Heron Island Dive Shop.

BARRIER REEF

In addition to the regular half-day trips around the island, Heron Island Resort also offers all-day excursions to the outer edge of the Great Barrier Reef and neighboring islands 7 to 15 miles away. The Shark Cat is used for these special trips as it can cruise at 40 miles per hour in calm seas. It normally takes an hour to reach the first location.

One of the most interesting dives available on the all-day excursions is a spot

known as **The Keyhole**. Divers are guided to a spot on the coral reef where they enter a vertical chimney at 30 feet. The hole is seven feet in diameter and goes straight down 60 feet, where it opens into a large coral cave. The floor of the cave is approximately 80 feet deep and divers can look upward to another entrance in the roof which is shaped like a keyhole. The inside is loaded with Australian lionfish (butterfly cod) who prefer the dim light of the cave because of their sensitive eyes. Exiting through the keyhole, divers are led to the vertical face of a coral drop-off where there are often many large stingrays.

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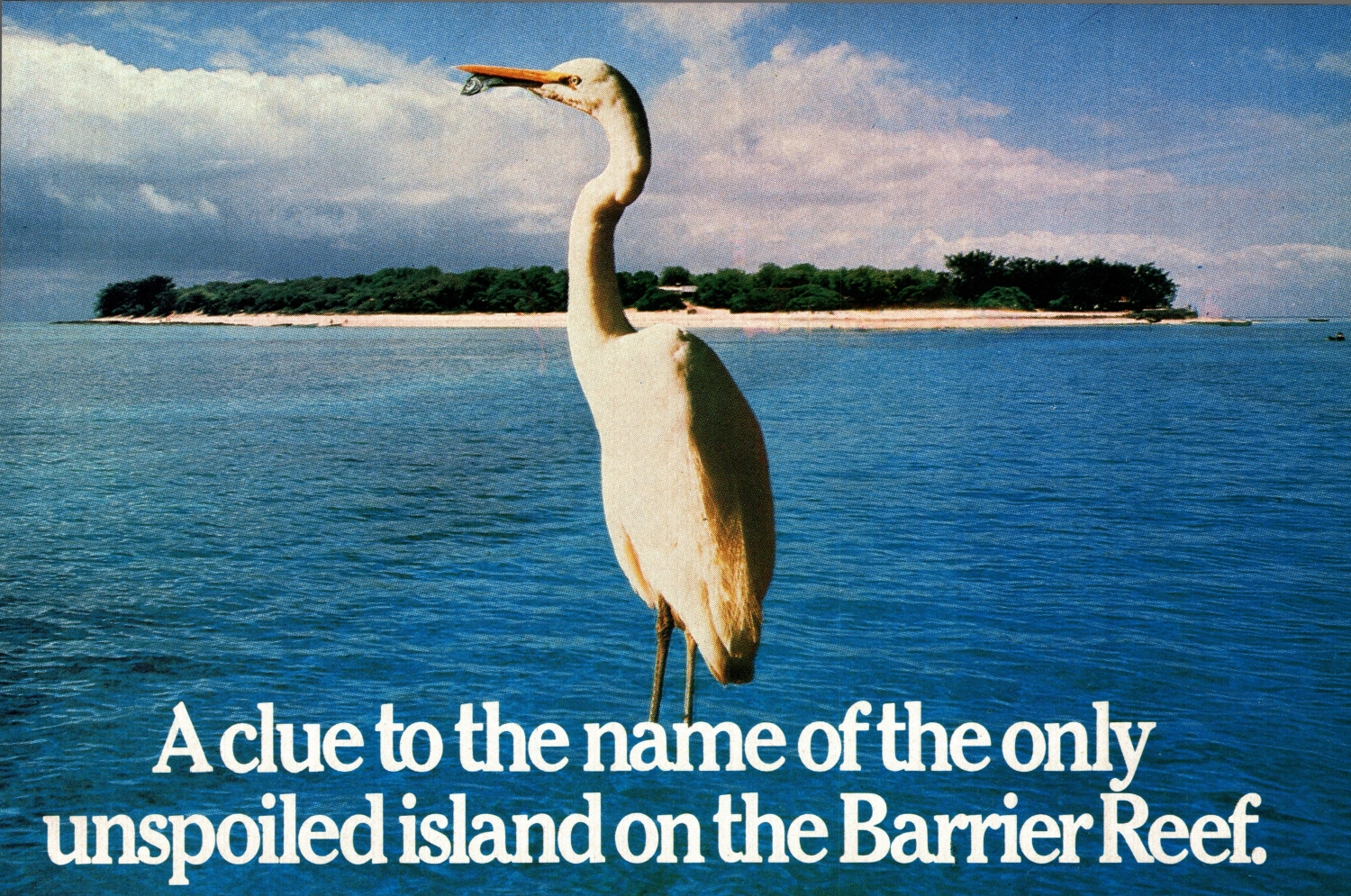
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A clue to the name of the only unspoiled island on the Barrier Reef.

72 kilometres out to sea from Gladstone is an evergreen coral cay that forms part of the Great Barrier Reef.

It's called Heron Island, named for the *Egretta Sacra*, or Reef Heron, which abounds on the island. The fact that it is actually on the reef, inhabited and unspoiled makes it unique.

Heron Island and

have little in common with Heron Island or the Barrier Reef.

The difference becomes obvious the instant you put your head under the water.

Heron Island is generally

tiny Damselfish, Sargeant Majors, and perhaps the handsome Red Emperor, who'll be as interested in you as you are in them.

Nothing you've seen in the movies will prepare you for it.

On land, the natives outnumber the visitors a thousand-to-one.

Mutton birds, noddy terns, silver-eyes, and the venerable green turtles that make Heron their nesting ground, will give you a glimpse of what the world used to be like.

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For more information on Heron Island contact your nearest TAA or Ansett travel agent or write to Heron Island, P.O. Box 72, Hamilton, Queensland 4007.



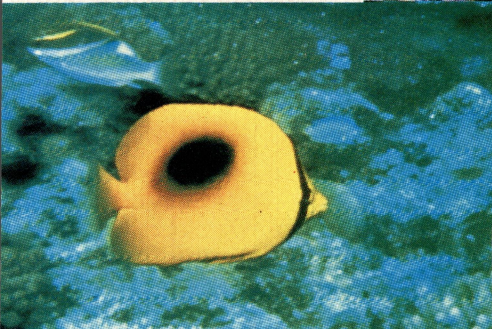
acknowledged to have the best diving in Australia, possibly the world.

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Then, we'll take you to a spectacular part of the reef, where you'll quietly blow your mind.

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Heron Island.
It's just a drop in the Ocean.

its surrounding Wistari Reef are so important as national treasures, they've been accorded National Park status.

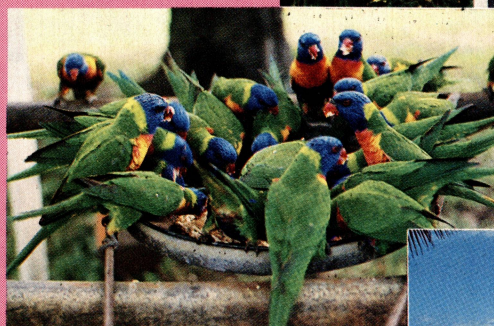
One of the most commonly held misconceptions is that the Barrier Reef is studded with island resorts.

It isn't.

All but two resort islands off the Queensland Coast are mainland islands, up to 50 kms inside the reef. Though each has its appeal, they



South Molle Island



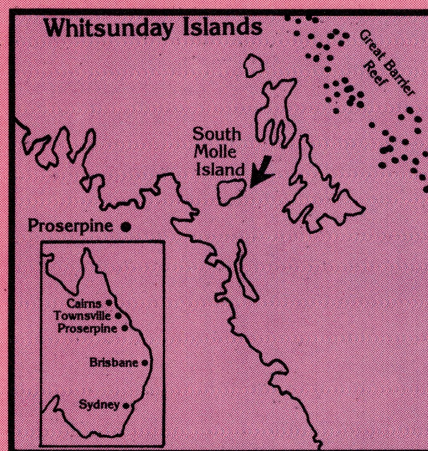
Wild lorikeets gather for the daily feeding at the Telford Resort. Left: the beach at the Telford South Molle Island Resort is a hub of water-sports activity.

South Molle Island is one of several luxurious family resort islands in the Whitsunday group, midway between Heron Island and Cairns. The Whitsundays represent a cluster of 74 different islands which have become a popular vacation center for both Australians and international visitors. They lie close to the mainland, five to 15 miles off the Australian coast. They are an ideal area for sailing, power boating, water skiing and board-sailing. The beautiful volcanic formation of these islands and their proximity to each other is reminiscent of the British Virgin Islands.

In order to reach South Molle Island, or any of the Whitsunday group, you must first fly to the city of Proserpine which has a large commercial airline terminal. If you are coming from Sydney, you can fly north to Brisbane, change planes and continue on to Proserpine. If you are coming south from Townsville, you can fly direct aboard Air Queensland. Once you arrive at Proserpine Airport, you then take a taxi or bus to Shute Harbour where you board a ferryboat for the island. An alternate method is to take a taxi to the smaller Whitsunday airport, board an amphibian plane, and fly to South Molle.

THE ISLAND

South Molle is an entirely different kind of island than Heron. While Heron is a flat coral cay of minuscule size, South Molle is a large hilly island of volcanic origin with wooded areas and spacious grassy valleys. While Heron is a solitary island in a wide open sea, South Molle is ringed by a dozen other islands within easy sailing distance. South Molle measures three miles long by one and one-half miles wide and covers more than 1000 acres. Ironically, South Molle has also been designated a national park because of its loveliness and unique wild life. The island has numerous bays and small inlets and is surrounded by fringing reefs.



THE RESORT

South Molle Resort is a miniature vacation city complete with stores, sport facilities, several restaurants and a wide selection of rooms. It can accommodate up to 500 guests at one time.

The resort offers five different types of rooms and bungalows, each with its own price level. These range from spacious bungalows along the beach to a hotel lodge with its own private courtyard. Many of the rooms are equipped with air conditioning, radio and television. This is a luxury resort as nice as any you might find in the Caribbean.

South Molle Resort just recently spent \$5 million on an expansion program which includes more rooms and sport facilities. There is a beautiful six hole golf

course, lighted tennis courts for day or night use and a squash court with three glass sides. A gymnasium has just been constructed and there are also facilities for volleyball, badminton, quoits, table tennis and billiards. After an exhilarating game, guests can relax in the spa or use the sauna. There are even pinball machines for the kids.

South Molle offers an equally extensive program of water sport activities. There is a beautiful Olympic size freshwater swimming pool and a large beach for sun-bathers. Boardsailors are available for rent and waterskiing, sailboat rentals, fishing trips and parasail rides also available. Boat cruises among the Whitsunday Islands are offered daily.

One of the high points of the day at South Molle is the 2:30 pm feeding of the wild lorikeets. A lorikeet is a tropical bird about the same size as a parakeet except its feathers are a brilliant combination of blue, yellow, orange and green. These birds live in the wild among the trees and shrubs of the island, but once a day they congregate near the golf course for a feeding orgy. The hotel staff puts out buckets of a tasty mash made of bread and honey. Hundreds of these wild birds come from all parts of the island to join the feast. The birds are perfectly tame—they will walk on your head, shoulders and outstretched arms and feed right out of your hand.

DIVE PROGRAM

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Other activities available include Bushwalking, Golf, Tennis, Squash, Sailing, Windsurfing, Water Skiing and Paragliding.

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South Molle Island

excellent choice for the casual diver who is seeking an all-around vacation that includes a little bit of diving and a lot of other activities. This resort facility is also a good choice for the vacationing family in which only one or two members have an interest in diving. At South Molle, there is something for everyone and family groups are seldom disappointed.

The level of dive services at this resort range somewhere between tourist and experienced diver. In fact, the resort accommodates both types. For example, snorkeling is an extremely popular activity at South Molle and just about all the guests give it a try. On the other hand, the experienced diver will find interesting macro photography among the nearby islands and can take an extended trip to the outer edge of the Great Barrier Reef at least three times weekly.

The dive services at South Molle Resort are conducted under the expert guidance of Barrier Reef Diving Services, a PADI affiliated training facility which has dive centers at Airlie Beach, Hayman Island and South Molle. This operation utilizes certified scuba instructors for the coral reef trips and conducts introductory classes in both snorkeling and scuba. While diving may not be the major activity at this resort, it is becoming increasingly popular and the hotel management is interested in providing scuba services for its guests.

REEF FERRY

South Molle Island Resort's newest and most exciting acquisition is a giant high speed catamaran ferry which can take hotel guests to the outer Barrier Reef in one and one-half hours. This incredible craft is constructed of marine grade aluminum, is 72 feet long and can carry up to 224 passengers. Built at the cost of \$1 million, this immense craft is powered by twin Detroit V-12 engines and has a cruising speed of 26 knots.

Named the *Telford Reef*, this giant double-deck catamaran makes three trips weekly to **Bait Reef** on the outer edge of the Great Barrier Reef. Most of the passengers are sightseers or snorkelers, but this craft can carry up to 20 scuba divers along with two certified instructors, serving as underwater guides. The stern is equipped with a large platform that moves up and down on an electric elevator winch. An inflatable boat is carried on this large platform and used by the scuba divers for their excursions among the coral reefs.



Colorful starfish and magnificent soft corals are common among the inner islands of the Whitsunday Group. The 75 foot catamaran, *Telford Reef* makes trips to the outer Barrier Reef three times a week.



The *Telford Reef* departs South Molle Island Resort at 10:30 am. Three hours are spent at Bait Reef for snorkeling and scuba before the catamaran returns to its home island in time for cocktails and a freshwater shower.

WHITSUNDAY REEFS

There are dozens of dive sites scattered among the islands near South Molle. Most of them are living coral reefs in shallow to medium depth water, featuring 50 species of coral, dozens of tropical fish and many types of macro creatures. While the visibility is not as good as the outer reefs, the marine life is abundant. Water clarity ranges from 20 to 50 feet. Probably the best thing about these local reefs is they can be reached in 5 to 15 minutes. Trips are mostly one tank dives in the morning and afternoon.

Butterfly Bay is perhaps the best of the local dive sites. This is a lovely coral garden at 30 feet, featuring tightly packed coral.

Langford Reef is another good spot which offers several mini-walls that begin

at 20 feet and drop vertically to 60 feet. It is a good location for macro photography, with lots of blue Christmas tree worms, wildly colored nudibranchs and many different mollusks. Other good sites include **Mackerel Bay**, **Hazelwood Island**, and **White Bay**.

While the diving among the Whitsunday Islands is interesting and good for macro photography, visibility is quite limited. The clarity of these waters can range from 30 to 50 feet and there are lots of nutrients in suspension. For really high quality visibility, divers must make the trip to the outer edge of the Great Barrier Reef which lies 35 to 40 miles east of South Molle Island. Here, visitors will find underwater visibility in excess of 100 feet, plus vertical drop-offs, canyons, archways and a wide variety of beautiful marine life.

Full day diving excursions to the Great Barrier Reef can be arranged upon request. Visitors can either board the *Telford Reef* catamaran for a ride out to Bait Reef or charter a private boat for excursions to other nearby locations.

Hayman Island

Hayman Island Resort is Australia's answer to Fantasy Island. There is no place on earth quite like it and your arrival is enough to boggle the mind: Amphibian aircraft land in the water directly in front of the resort and drive up on the beach to off-load their passengers. Further down the beach is a concrete landing pad where a giant Ansett helicopter off-loads more guests. Beyond the helicopter is a 3000 foot boat pier which juts out into deep water and accommodates cruise ships, fishing boats and dive boats. Most incredible of all, is a miniature railroad perched on top of the boat pier which conveniently transports boat passengers from the pier to a railroad station in the center of the resort. The beach is alive with sun worshippers and vacationers having a good time. It is not long before you are swept up in the excitement and anticipation of this unique island community. It is truly an incredible experience.

THE ISLAND

Hayman Island is one of the 74 islands in the Whitsunday group, but it is much further out to sea than South Molle. In fact, Hayman is one of the islands closest to the Great Barrier Reef—it is only 18 miles from the boat pier to Bait Reef. The island itself covers approximately 988 acres and is basically a horseshoe shaped mountain which rises 825 feet above sea level. At the base of the mountain is a curved portion of shoreline and a flat, tree shaded area where the Royal Hayman Hotel sits. The hotel is fronted by a wide sand beach and beyond it lies an 8000 yard coral reef. Much of this area is now a National Marine Park with protection for the corals, seashells and fish.

The island itself is exceptionally beautiful and hiking trails literally ring the entire island. Landmarks along the trail include; Whitsunday Passage Lookout, Blue Pearl Bay, Dolphin Point and Hernando's Hide-away. The entire walk around the island is about five miles. It is an interesting trip which provides the visitor with a close look at lots of Australian vegetation and many rare birds including cockatoos, kookaburras and currawongs.

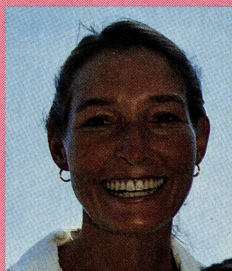
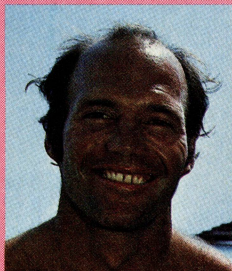
THE RESORT

The Royal Hayman Hotel is probably one of the most unique island resorts you are likely to find anywhere in Australia. It is quite a large facility and could be best described as a tropical vacation village, complete with small shopping arcade, extensive convention facilities, and street

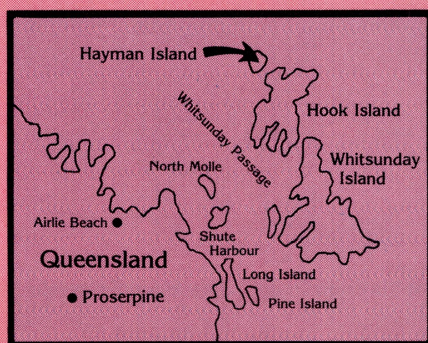
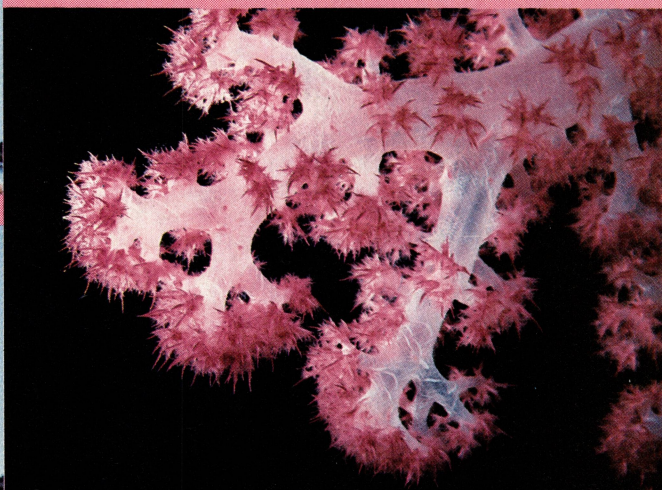
after street of private vacation cottages. The hotel can accommodate several hundred guests comfortably and offers many unique attractions, not to mention its own miniature railroad.

The resort facility was originally de-

cluding a \$10 million refurbishing in 1981. Hayman Island is blessed with a long wide sandy beach directly in front of the hotel. It is an ideal playground for watersport enthusiasts and guests can enjoy a variety of activities including; water ski-



Tony and Patricia Fontes are co-owners of Barrier Reef Diving Services at Hayman Island. The Hayman Island dive boat, *Day-break*, makes daily trips to islands in the Whitsunday Group.



signed by the imaginative mind of Reginald Myles Ansett, founder of Ansett Airlines. Seeking a way to keep his planes full during the off season months, Ansett came up with the idea of a winter resort. He designed an extremely fashionable hotel and even planted 1300 palm trees to give the island a south seas atmosphere. The hotel first opened on July 4, 1950 and since then has undergone much expansion and improvement, in-

ing, boardsailing, mari-cat sailing, swimming, snorkeling and para-flying. The more serious beach fans can participate in a game of volleyball on either the beach or knee-deep water. The beach is usually a beehive of activity for both the young and old.

Scattered around the resort property are several freshwater swimming pools including an Olympic size pool in the main hotel section. Other outdoor sports available to guests include tennis, bowling, sportfishing and sailing cruises.

If you are seeking a special fantasy, you can book a flight aboard one of Air Whitsunday's amphibious seaplanes which will take you on an aerial tour of the Great Barrier Reef at the breathtaking altitude of 500 feet above sea level. Using three passenger Laker amphibians, Air Whitsunday will pick you up right on the beach and take you on the most marvelous ride over such interesting coral lagoons as Bait, Hook and Hardy reefs. If you like, the seaplane will actually land inside the Barrier Reef Lagoon and you

Hayman Island

can spend a couple of hours snorkeling or reef walking along the top of these amazing coral formations.

In the evening, Hayman Island Resort comes alive with entertainment. The main dining room serves an elegant dinner with gourmet quality cuisine. After dinner, guests adjourn to the Cabaret Lounge for music, dancing and night club entertainment. A live band plays every night. Certain evenings are set aside for theme presentations such as; South Sea Island Night, Latin Night, Horse Racing Night or Get To Know Your Neighbor Night. The Cabaret Lounge is open from 7:00 pm to midnight and if you still have the energy, you can go to Hernando's Hideaway Disco which is open until 4:00 am.

DIVE CENTER

The Hayman Island management is quite serious about developing it into a world class dive resort. There is a full service dive shop right on the premises near the main swimming pool. The center is equipped with its own air compressor and 35 scuba tanks. Services offered include scuba instruction and daily dive trips to both nearby reefs and the Great Barrier Reef.

The Hayman Island Dive Center is one of the major service centers for the Barrier Reef Diving Services. This business is owned and operated by Tony and Patricia Fontes. Tony is originally from Santa Cruz, California and has been diving for 11 years. He is a PADI master instructor and an ITC course director.

DIVE BOAT

The Hayman Island Dive Center operates a 54 foot custom dive boat called *Daybreak*. This craft has very high freeboard and is a particularly dry vessel for cruising among the islands. The boat can carry 15 divers and makes dive trips twice daily. The morning departure is at 9:00 am and is a one tank dive. The afternoon trip departs at 1:30 pm and is also a one tank dive followed by snorkeling. An all-day dive trip to Bait Reef is scheduled three times weekly. It departs at 8:00 am and returns to the island at 5:00 pm with plenty of time for relaxing before dinner. Special boat charters can also be arranged on request.

DIVE SITES

There are over 20 excellent dive sites in the area around Hayman and neighboring Hook Island. Since these islands are much farther offshore, underwater visibility is much better, 40 to 60 feet, and

the reefs are alive with soft corals, invertebrates and reef fish. These are excellent areas for close-up photography.

A good example of the local dive sites is a point off the northern tip of Hook Island called **The Wood Pile**. A high, rocky bluff with log shaped basalt crystals looks very much like a pile of logs and marks the spot. The rocky wall drops vertically from the surface to 70 feet and then slopes gradually to 110 feet. The entire underwater formation is deeply etched with crevices, caves, archways and tunnels. Toward the point, one encounters a great deal of fish activity. Yet, this location is perhaps best known for its tremendous abundance of nudibranchs. There are at least 20 different species which can be easily found and the dive guides will bring you a new specimen just as fast as you can photograph the last one. These amazing little invertebrates span the entire spectrum of vivid colors and their design patterns are often breathtaking. Back toward the bay there

The most memorable spot is Alcyonaria Point which is loaded with a fantastic array of soft corals. The most prolific ones are in shades ranging from pale lavender to royal purple. There are also quite a number of bright red soft corals with white, branching stalks. A much more rare find is the solid orange soft coral which lives at 60 feet. There is only one of these in the entire bay.

Other attractions within Butterfly Bay include a fine selection of colorful nudibranchs, many lovely tube worms, and various types of shrimp and other invertebrates. There is a rock off the point of Butterfly Bay which has a 40 foot mini-drop-off. The area is thick with hard corals which form an interesting matrix of caves, tunnels and archways. The area is also inhabited by all types of interesting tropical reef fish in dazzling colors. Butterfly Bay is considered to be a fantastic spot for night diving.

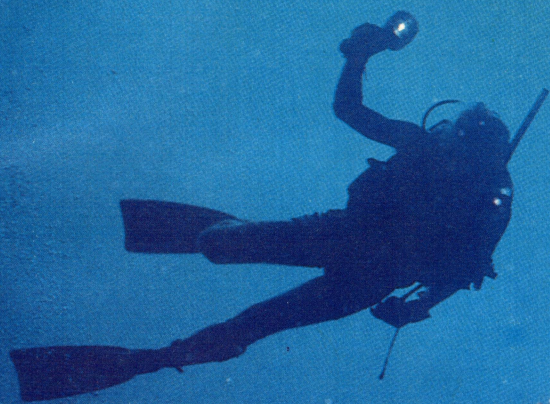
Other excellent dive sites around Hook Island include; **Stonehaven, The**



Air Whitsunday seaplanes bring guests from the Australian mainland to the beach at Hayman Island. The Hayman Island Train provides convenient transportation between the pier and the hotel. Above right: the main pool at the Hayman Island Resort.

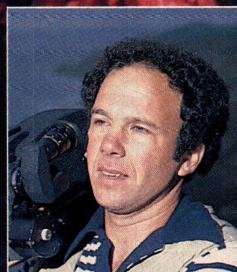
Narrows, Coral Trout Point, Manta Ray Bay, and Pinnacle Point. The best dive sites around Hayman Island include; **Blue Pearl Bay, Dolphin Point, The Valleys** and **Hernando's**. At Bali Hai Island there are two good sites known as **Black Coral Ledge** and **The Channel**. Langford Island offers two locations known as **Daisy Coral Flats** and **The Spit**. Nearby Bird Island also has two sites called **The Beacon** and **The Hollows**. You could spend two weeks diving among these islands and never see it all.

First Choice

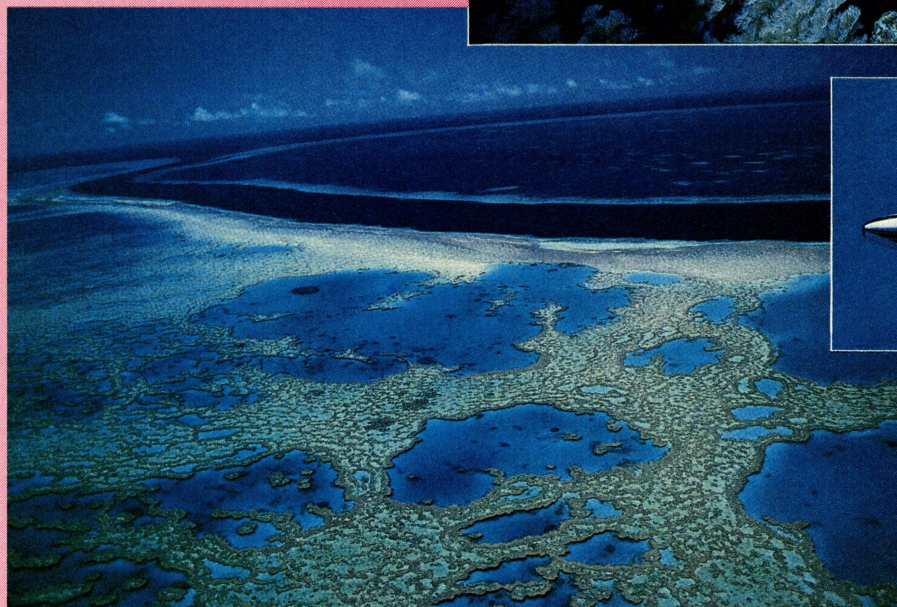


For action packed diving, variety of marine life, exciting seascapes, and photographic opportunity, I'll take the waters of Australia's Great Barrier Reef and Coral Sea everytime. On almost every dive I see something noteworthy that I've never seen before. What more can a diver ask?....Marty Snyderman

Marty Snyderman



Bait Reef



Clockwise from left: A fabulous aerial view of the Hardy Reef lagoon and channel—next to Bait Reef. Patricia Fontes with coral at Bait Reef. Golden Christmas tree worms at Christmas Tree Point, Bait Reef. Landing in the lagoon at Hardy Reef.

Twenty miles beyond the Whitsunday Islands lies the world's most remarkable undersea formation, the Great Barrier Reef. It is an enormous chain of living coral reefs, drop-offs, channels and shallow lagoons which stretch for 1250 miles along the Australian coast. Bait Reef is part of this extraordinary coral chain, and it offers visitors an opportunity to conveniently sample the thrills and adventure of diving on the world's most fantastic reef. Bait is more than just a single reef. It is an area comprised of many reef systems. Nearby are the twin formations called **Hardy Reef** and **Hook Reef**. Much larger in size, these two reefs cover miles of shallow coral gardens separated by a winding deep water channel that looks like an underwater version of the Grand Canyon. From the air, the view of this reef system is exquisite. Farther on are **Black Reef**, **Knuckle Reef**, **Kennedy Reef**, etc.—altogether, 50 reef systems.

Ironically, Bait Reef is one of the smallest reef systems of the group, but it is the closest to the Whitsunday Islands and the easiest to reach. It is almost circular in shape, with vertical drop-offs on the outside and shallow coral gardens inside. Despite its small size, Bait Reef has at

least 8 to 10 excellent dive sites which offer unusual undersea attractions.

Nudibranch Point provides good examples of the strange sights you are likely to encounter. The bottom is a hilly mixture of coral ridges, deep valleys and solitary coral heads in 20 to 80 feet of water. This spot is virtually swarming with nudibranches of every color and description. There are yellow ones with blue stripes, glowing pink ones with green stripes, purple ones and a couple dozen more species. A macro photographer could easily burn up six rolls of film.

Christmas Tree Rock is another bizarre dive site which will quicken the heartbeat of any photographer. This location is marked by a large coral head which is covered with Christmas tree tube worms. There must be 50 or more on this one head, and many more on nearby coral formations. Their numbers are impressive, and their colors are breathtaking. The coral head looks like a flower garden filled with vibrant splashes of blues, yellows, reds, whites and a dozen more hues. One species is candy-cane striped red and white. The scene is magical.

Manta Ray Drop-Off is perhaps the most exciting dive spot at Bait Reef. It is

marked by a gigantic coral rock which is off the main reef and separated from it by a narrow canyon. The drop-off begins at 10 feet and drops vertically to over 120 feet. Underwater visibility exceeds 100 feet and schools of fish cruise along the face of the wall. This spot was named after the manta rays which are frequently seen gliding along this drop-off. At the base of the vertical wall there is a deep reef which is covered with large soft corals in many exotic colors. These corals are different than their shallow reef cousins and triple their size. At 60 feet there is a tunnel opening on the face of the vertical wall. You can actually swim through the tunnel, up a vertical coral chimney and surface in the center of the giant coral boulder. This miniature coral tidepool is completely surrounded by coral rock and protected from the sea.

The Stepping Stones is another Bait Reef phenomenon consisting of a series of slender coral pinnacles which rise from 80 feet of water, coming to within a couple feet of the surface. This underwater fairyland is loaded with fish, soft corals and colorful marine life. Still other Bait Reef sites include: **North Lagoon**, **Pitt Street** and **South Lagoon**.

Lizard Island

Lizard Island is the smallest and most intimate island resort which offers diving. It can handle a maximum of 30 guests and there is generally only 20 to 25 people at one time. Known as Australia's VIP resort, this secluded hideaway offers a high degree of privacy and tranquility. If you want to get away from it all, Lizard Island is the best choice for restful relaxation—as well as spectacular diving.

LOCATION

Lizard is the northernmost resort island on the Great Barrier Reef. It is 160 miles north of Cairns and 20 miles off the uninhabited coast of Cape York. Heron Island lies 750 miles to the south, at the other end of the Barrier Reef. The most important aspect of Lizard Island's location is the fact that this resort is very close to the Ribbons Reefs, undoubtedly the best dive area on the entire Great Barrier Reef system. Legendary dive sites such as **The Cod Hole** and **Dynamite Pass** are only 10 miles away.

THE ISLAND

The topography and climate of Lizard is far different than either Heron or the Whitsunday Islands. It is a mountainous rocky island with an arid climate, low scrub brush and lots of giant boulders. It has a primitive type of beauty which is fascinating for exploration. The island was named after the giant iguanas (lizards) which inhabit the area. Some of these amazing reptiles grow to four feet in length and have actually become pets at the resort. The iguanas spend most of the day quietly resting in the shade and occasionally amble around the hotel hopping for a handout from the staff.

Lizard Island is quite large in size, covering 2500 acres. It boasts of a total of 24 secluded coves and sandy beaches, including a lovely one directly in front of the hotel. The island is ringed by fringing coral reefs and submarine gardens, many of which provide excellent opportunities for snorkeling and shallow water scuba. Because of the unique flora and fauna of this remote island, Lizard has been designated a National Park Reserve and the hotel management is dedicated to the preservation of its wildlife.

Although Lizard is remote and primitive, it is conveniently linked with the civilized world. It is one of the few Barrier Reef islands that has a modern landing strip. Air Queensland operates daily flights from Cairns to Lizard as part of its sightseeing tours in the Cape York/Barrier Reef area. These flights also provide convenient transportation for visiting and

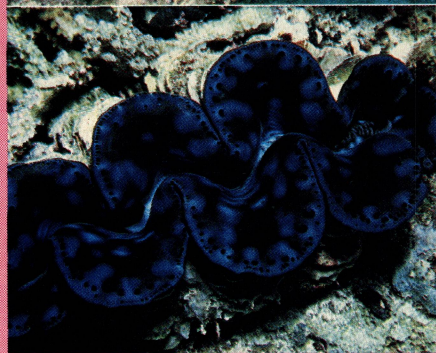
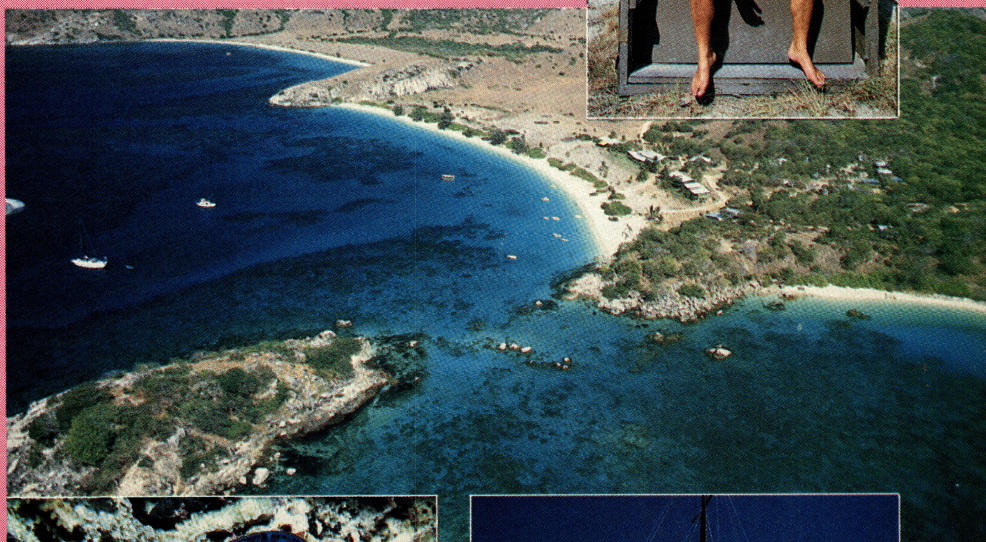
departing hotel guests.

THE RESORT

In contrast with the island's primitive environment, Lizard Island Resort is a very modern, well-kept hotel which is totally self-sufficient. The hotel consists of a lovely dining room, cocktail lounge and 15 bungalow suites that can accommodate up to two people each. There is a tennis court and a three hole sand golf course for putting practice. Most of the resort's sport facilities center around the beach area where there are sailboats, paddleboards, boardsailers and small outboard dinghies for exploring the many coves and beaches around the island.

Big game fishing is a major activity at Lizard Island Resort and the hotel operates a well equipped sportfishing cruiser.

A prime example of the lizards of Lizard Island is this five foot long iguana. These huge, harmless reptiles roam the island in freedom, unmolested by man. Below: Lizard Island and its resort by the sea.

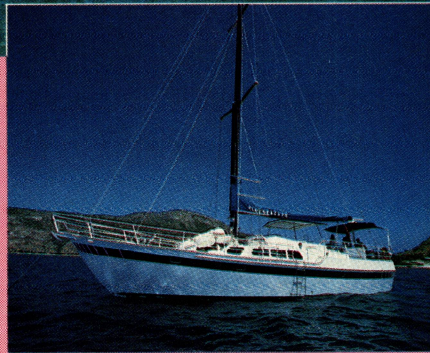
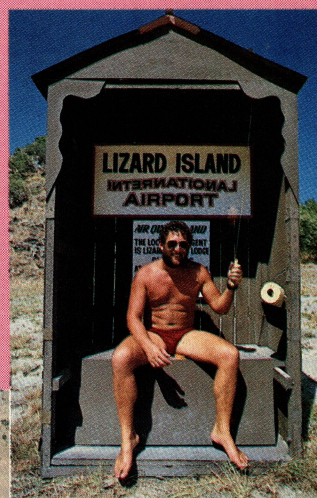


The marlin season runs for 10 weeks from September to November. During the rest of the year, the fishing activities center around bone fishing, tuna, cobia and wahoo. Big game fishermen fly in from all parts of the world to sample Lizard Island's high quality fishing.

DIVE CENTER

This year Lizard Island Resort installed complete scuba diving facilities, including an air compressor, scuba gear, snorkel equipment and a dive shop on the premises. A qualified underwater guide will be on hand to conduct dive tours to nearby reefs as well as the best sites along the outer Great Barrier Reef. The hotel will be operating a high speed 30 foot dive boat which can cruise at 25 knots and make the trip to the Cod Hole in 30 minutes.

David Loughnan at Lizard Island Airport's "waiting room." Bottom: A *Tridacna* clam. The dive boat *Scheherazade*.



Lizard Island

ISLAND YACHT

In addition to the hotel's regular dive operation, Lizard Island will be working in conjunction with the 55 foot aluminum yacht *Scheherazade*. This craft is owned and operated by Capt. Peter Wright, an experienced sailor and dive guide who originally conducted a similar operation in the British Virgin Islands. The craft can carry up to six divers comfortably. It has two double berthed private cabins plus a cozy saloon area.

The *Scheherazade* can cruise under engine power or sail if the wind is right. This combination of sailing and diving provides an opportunity for a unique vacation experience. The yacht is equipped with a six cfm air compressor and 10 scuba tanks. There is also a small runabout with a 40 hp outboard which is used for excursions among the shallow reefs as well as waterskiing in the early evening. The *Scheherazade* operates out of Lizard Island, conducting three to seven day cruises among the upper Ribbons Reefs, including Cod Hole, Dynamite Reef, Half Mile Passage and many other dive sites.

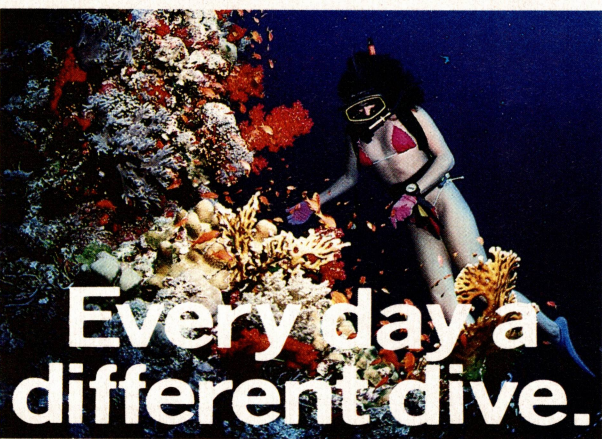
DIVE SITES

The fringing coral reefs surrounding Lizard Island offer quite a number of interesting sites for guests seeking a quick and convenient dive experience. These spots are a five to ten minute boat ride from the hotel and the waters are generally calm and very warm. According to marine biologists who conduct research in this area, the best time for diving is November through March. This is when the waters are the clearest and marine animal activity is at its peak. It does not rain or storm around Lizard Island as it does on the mainland and Lizard enjoys exceptionally balmy weather.

There is one dive site at Lizard Island which can only be described as an incredible undersea phenomenon. **Clam Garden** off Watson's Bay is a secluded cove inhabited by an estimated 500 to 700 *Tridacna* clams. Dive depths range from 5 to 25 feet and the bottom is literally carpeted with marine life, including an extremely dense population of these extraordinary clams. There are several species and they range in size from small ones the size of a human fist to giant clams four feet across. The giant clams are particularly impressive as they are spaced two to three feet apart with a dozen or so in a room sized area. The mantles of these amazing animals can range in color from cobalt blue to emerald green to chocolate brown. Since Lizard Island is a National Park, this colony of clams is closely watched by the hotel management and fiercely defended from poachers and souvenir collectors.

In addition to this amazing colony of clams, Clam Garden is also loaded with other unique coral reef life. There are hundreds of carpet anemones in the area and each is occupied by two or three anemone clownfish. There are at least three or four species of this fish and photographers could spend hours here happily snapping close-ups of clownfish. There is also a remarkable abundance of blue starfish, found only in the South Pacific. Other fascinating creatures include Christmas tree worms, shrimps, crabs and small, exotic reef fish.

Other dive sites around Lizard Island include **North Reef** just off Mermaid Cove, best noted for its coral caves and canyons in depths ranging from 50 to 100 feet. **Eastern Reef** is a sheer cliff drop-off which plummets vertically to a depth of 100 feet. It is an excellent spot for photographing both hard and soft corals. **Blue Lagoon** is a giant bommie (coral head) in the opening of a pass with dive depths to 60 feet. This location has 50 to 60 foot visibility and is loaded with corals, sea-fans and lovely marine life. Of course, the highpoints of a vacation at Lizard Island are the more distant trips to the outer edge of the Barrier Reef where one can explore and photograph the dazzling sights among the Ribbons Reefs. This is an area of truly high adventure.



Lizard Island on the Great Barrier Reef, Australia.

Just 30 minutes from some of the world's most spectacular diving locations, Lizard Island gives easy access to amazing wildlife and breathtaking formations.

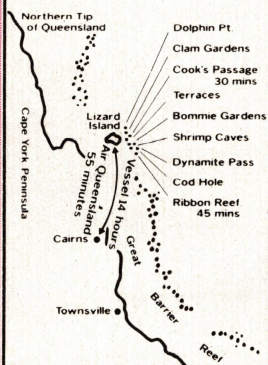
Fast charter vessels take you on easy day trips to Cod Hole, Dynamite Pass, the Ribbon Reefs and more.

It's a diver's paradise — especially when you explore it all from the relaxed, unspoiled beauty of Lizard Island resort.

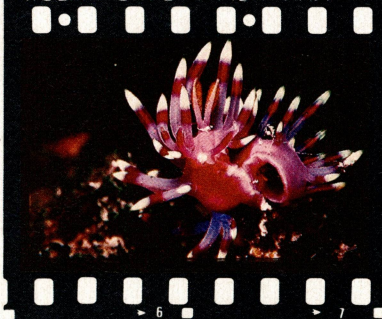
Between dives, the all-inclusive tariff covers all scuba gear, gourmet meals, superb recreational facilities and equipment — and some of the best hospitality Down Under.

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Australia.
Ph: (070) 51 6203
Telex: 48 448



Valerie Taylor with Giant Potato Cod
KODAK SAFETY FILM 5037



Colourful Nudibranches abound



Valerie Taylor with Porcupine Fish

Photos courtesy of Ron & Valerie Taylor

Lizard Island.

Great Barrier Reef, Australia

LI/SSB/041R

The Ribbons Reefs

Over the past few years, the **Ribbons** have attained worldwide acclaim as the best and most exciting dive areas on the entire Great Barrier Reef. There are wondrous coral reef formations and rare animal encounters which cannot be experienced anywhere else on the Barrier Reef or in the world for that matter. This one-of-a-kind area has not only attracted visitors from all over the world—it has become the basis of a thriving and growing live-aboard dive boat industry. Today, there are at least a half-dozen live-aboard dive boats which cruise and dive the Ribbons on a regular basis.

The largest live-aboard dive boat to operate among the Ribbons is the *Reef Seeker*. This giant 63 foot catamaran is virtually a floating hotel. She is 30 feet wide, double-decked and can carry up to 24 divers in private and semi-private cabins. The *Reef Seeker* is one of the few Australian live-aboard boats which can accommodate a large group or club.

The most elegant dive boat to operate in these waters is the brand new 90 foot luxury yacht *Mantaray*. Designed and constructed by owner Graham Warren, this ultra-modern yacht is built completely of steel with an aluminum superstructure. It is designed to carry 12 guests in luxury and the ship is staffed by a crew of five. The vessel is outfitted with complete scuba gear, air compressors and the most modern navigational equipment. Skippered by Captain David Thus, the *Mantaray* is planning a series of special dive charters to the ten different Ribbons Reefs systems, plus extended cruises to the Coral Sea beyond.

One of the most personable dive boats to operate in the Ribbons area is the *Bali Hai II*, a 50 foot cruiser that can carry a maximum of eight divers. This vessel is also equipped with a heavy duty air compressor, scuba tanks and a stern diving platform. Skippered by owner Gordon Oke, the *Bali Hai II* strives for highly personalized service and very fine meals. This boat makes five or ten day trips, departing from Cairns and making frequent trips to the best spots in the Ribbons.

DIVE SITES

It would be impossible to list all of the Ribbons dive sites in the limited space of this section. There must be over 100 different locations which could be rated superior: Each one offers something unique or special. The Ribbons cover an area of almost 80 miles. The diving is excellent

on the outside edge, the narrow channels among, and the shallow water coral patches inside, the Barrier Reef line. Divers become so hyped by the underwater attractions that they frequently make four and five dives daily. This area is a veritable supermarket of scuba fantasies which exceed most diver's wildest dreams.

The most incredible spot among the Ribbons Reefs is a place called the **Cod Hole**. Strangely enough, this location is neither a hole nor is it occupied by cod. Instead, it is the edge or side of a pass between two coral reefs inhabited by an amazing family of giant groupers. The dive depth averages 50 feet. The location was first discovered by Ron and Valerie Taylor almost ten years ago. Purely by luck, Ron and Valerie stumbled upon this

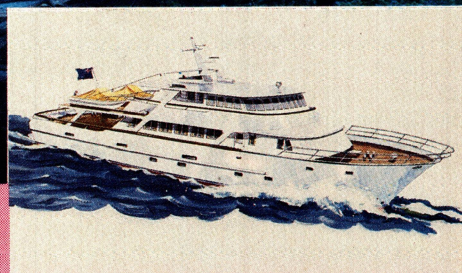
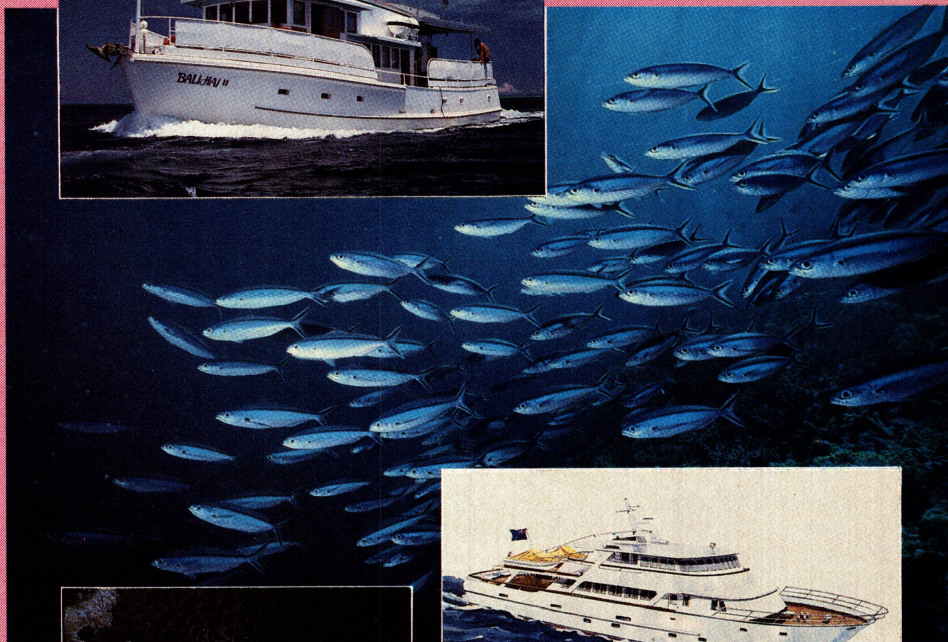
colony of curious fish that immediately befriended the divers and followed them around like puppy dogs. The behavior of these ordinarily shy fish was unusual.

Australians call these huge creatures potato cod, but they are actually a species of white grouper with large black spots. The creatures vary in size from 80 to 160 pounds, yet move about with the grace of ballet dancers. They have very large mouths but tiny teeth.

There are an estimated nine or ten of these huge fish at the Cod Hole and over the past few years they have become very tame. Dive guides take down large buckets of baitfish and spend most of the dive handfeeding these gentle giants. Five or six fish will usually congregate around the guide, nuzzling and pushing



Left: The 50 foot, eight passenger Bali Hai II, based in Cairns, is the most personalized dive boat operating in the Ribbons Reefs. Below: Schooling fish at Dynamite Pass in the Ribbons.



The M/V Mantaray is the most luxurious dive boat in operation in the South Pacific.



This unspoiled wilderness is home to multitudes of exotic marine creatures.

The Ribbons Reefs

one another to gain a better position. The great fish can be petted, patted and scratched under the chin. They will stand on their heads, roll over on their sides or patiently pose for pictures in hopes of gaining additional morsels of food.

Diving with the giant groupers of Cod Hole is the thrill of a lifetime. It is like

are likely to see just about every fish that swims in this part of the ocean. There are schooling fish of many species, giant pufferfish three feet long, large turtles, stately stingrays and clownfish everywhere. Should you want to stop along the way, it is a simple matter to duck into one of the many crevices or caves that honeycomb the sides of the channel. At one point there is a giant coral cave at 30 feet, filled with magnificent orange seafans with beautiful featherstars perched on them. You could spend an entire dive shooting close-up photographs in this one cave alone.

Another exciting dive site is **Dolphin Point**, a sloping drop-off on the outside edge of **Day Reef**. Dive depths range

depths ranging from 8 to 20 feet. Some of the coral formations are extremely large and the entire area covers 100 yards of dazzling reef structures. The area is loaded with staghorn, plate, brain and lovely soft corals with interesting colors. There are also giant clams in this area and a wide variety of coral reef fishes. It is a good spot for snorkeling and photography.

The Terrace is an interesting drop-off on the outer edge of **Yonge Reef**. This formation is a series of descending ledges or steps which range from 30 to 120 feet. Each terrace is loaded with hard corals, delicate soft corals, large gorgonian fans and even some *Tridacna* clams. Underwater visibility exceeds 100 feet.

Top left: The stern of the Reef Seeker, the largest live-aboard dive boat operating in the waters of the Great Barrier Reef. Top right: Divers easily climb aboard one of two dive platforms on the Reef Seeker.

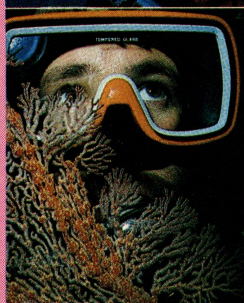
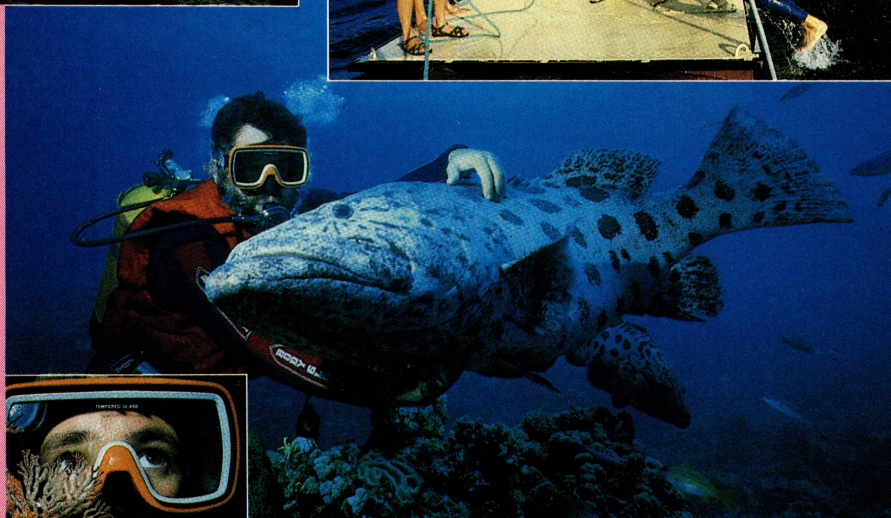


walking among a herd of wild buffalo—yet the creatures are very docile. While potato cod can be found on other areas of the Great Barrier Reef, the Cod Hole is the only place you will find so many that are so tame. In fact, it is such a rare phenomenon that the Queensland Government has declared the Cod Hole a marine park, thus protecting these magnificent creatures from extinction.

Not far from the Cod Hole is another spectacular reef formation known as **Dynamite Pass**. This unique formation consists of a fairly narrow channel between two barrier reef formations. On both sides of the channel the coral reef comes to within six inches of the surface at low tide. The walls of the channel drop vertically from six inches to 80 feet before sloping off into deeper water. The tidal current in the channel runs a brisk three to four knots and the divers drift along the sides of the wall.

It is the vertical walls of the channel that are so spectacular. They are literally covered with brilliantly colored fans, soft corals, sponges and other exotic marine life. While drifting effortlessly along these vertical drop-offs one can view hundreds of orange or brilliant yellow seafans. Soft corals can be seen in a dozen different colors ranging from blood red to canary yellow. Clinging to the seafans are delicate featherstars in silver, white, yellow or orange. Dynamite Pass is a breathtaking experience which defies description. Visiting divers frequently request two or three dives in this one pass because there is so much to see.

As you cruise through the pass, you



Above: David Loughnan hugs one of the giant potato cod at the Cod Hole in the Ribbons. These immense groupers are accustomed to handling by divers. Nine of these unusual animals live in a colony at this protected location.

from 30 to 130 feet and the underwater visibility can exceed 100 feet. There is a great deal of pelagic fish activity in this area, including schools of jacks, dolphin-fish, and even tuna. It is an excellent spot for observing medium sized sharks, mostly silvertips, blacktips and an occasional bronze whaler. Sometimes, the dive guide conducts shark feeding sessions here so that underwater photographers can obtain interesting pictures.

Coral Gardens is an ideal spot for the less adventurous diver more interested in beauty than the beasts. This is a shallow to medium depth coral heads area with

Shrimp Caves is a shallow coral lagoon area inside the Barrier Reef near **Cormorant Pass**. It is a popular location for night dives, with dive depths averaging 40 feet. The reef is loaded with corals of every type and their extended polyps provide a beautiful nocturnal scene. Night dive excursions provide an opportunity to see and photograph sleeping parrotfish, lionfish, coral shrimp and seashells.

Additional dive sites among the Ribbons include; **Bommie Garden, Cook's Passage, Half-Mile Passage, Drift Wall, Petricola Bommie, The Channel** and about 90 more.

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photos/ Gen Murphy

The Reef Explorer gives on-site access to the remote Coral Sea.

Northern Coral Sea

BY STAN WATERMAN



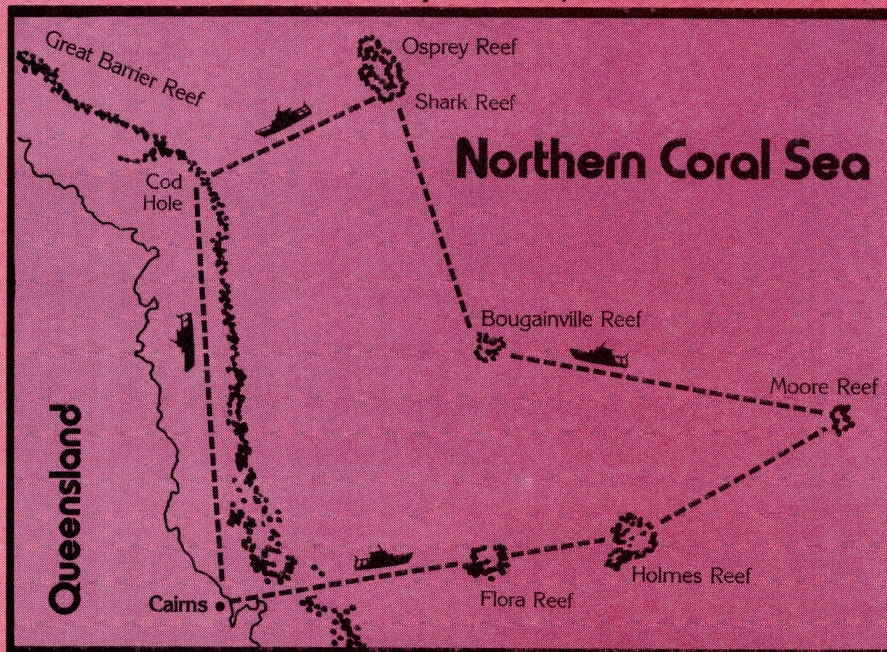
Divers enjoy a hearty meal aboard the luxurious Reef Explorer.

I am frequently asked where I have experienced the finest diving in my travels. For me there is no ready answer. No single dive location is the be all and the end all of experience. At the same time, there are few places that have failed to provide some wonderfully unique experience, something special and compelling.

My most recent experience was in the Coral Sea and along the Great Barrier Reef of Australia. Without hesitation I can write that the experience was one of the finest I have ever had in almost 40 years of diving. It was not my first trip to that part of the world. The reader may recall that we filmed the exciting shark sequences for *The Deep* at one of the ocean reefs in the Coral Sea.

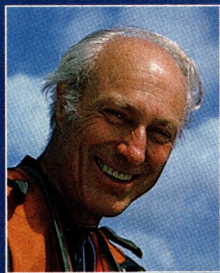
But this fall, under the aegis of Dive in Australia, and the excellent planning of its president, David Loughnan, I enjoyed a tour de force of most of the best dive areas in that part of the world. I also lived like a spoiled potentate on an incredibly luxurious private yacht as the guest of old

Below: The dive cruise route followed by the Reef Explorer in the Northern Coral Sea.



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of unspoiled, untamed ocean reefs.



Stan Waterman



Northern Coral Sea

friends, the Packer family.

We opened the dive tour with three days of intensive diving on the wreck of a large passenger ship, the *Yongala*. This 70 year old wreck lies in 90 feet of water about 53 miles from Townsville on the Queensland Coast. The wreck is in open water between the Barrier Reef and the mainland and rests on an open sand bottom. It has become an isolated reef and thus attracted an incredible range of marine life, both pelagic and resident. It has the greatest density of marine life I have ever encountered on a wreck. At the top, 45 feet down, big stingrays hang motionless on the current updrafts, balanced like hang gliders. Schools of eagle rays circle the upper wreck area in company with jacks and spadefish. At the bottom and under the bow dense schools of snappers part before the swimmer to reveal more stingrays cruising the mollusk beds. Huge groupers (in the 300 pound class) provide background action.

A rare sight to me was a school of about 100 cobia lying on the bottom to one side of the *Yongala*. They seem to be resident and move about the wreck, appearing on different days in different sectors of the sand perimeter.

By night, monstrous big loggerhead turtles take cover under the wreck. Like ostriches they feel secure with their heads concealed, although their huge bodies are fully exposed. The appearance is much like an elephant trying to hide in a tool shed. The turtles are easily handled and ridden upon, if you enjoy that bizarre sport. At night the labyrinthian interior of the ship is clothed in brilliant reds and oranges as the soft corals expand for feeding. Lights are, of course, imperative—the stronger the better.

With unusual forethought the government has made the *Yongala* a national preserve. Thus it should be well protected for generations of divers to enjoy.

The *Yongala* is a hard act to follow and should really come at the end of a tour. But for us the timing was right. While we were there one of the Coral Sea dive boats, the *Reef Explorer*, was also on location. Her captain and part owner, John Bound, was on leave from *Reef Explorer* and working with us on the *Scotch Mist II* as our guide.

As I indicated, our yacht, *Scotch Mist II*, was all a hedonistic, Sybaritic, superannuated skin diver could dream of: A 90 foot sloop with wine bilge, Cordon Bleu chef, a crack British crew that included a nubile hostess named Debby with more curves than a ski jump, and a cruising range that could take its owners and

guests across any ocean in the world.

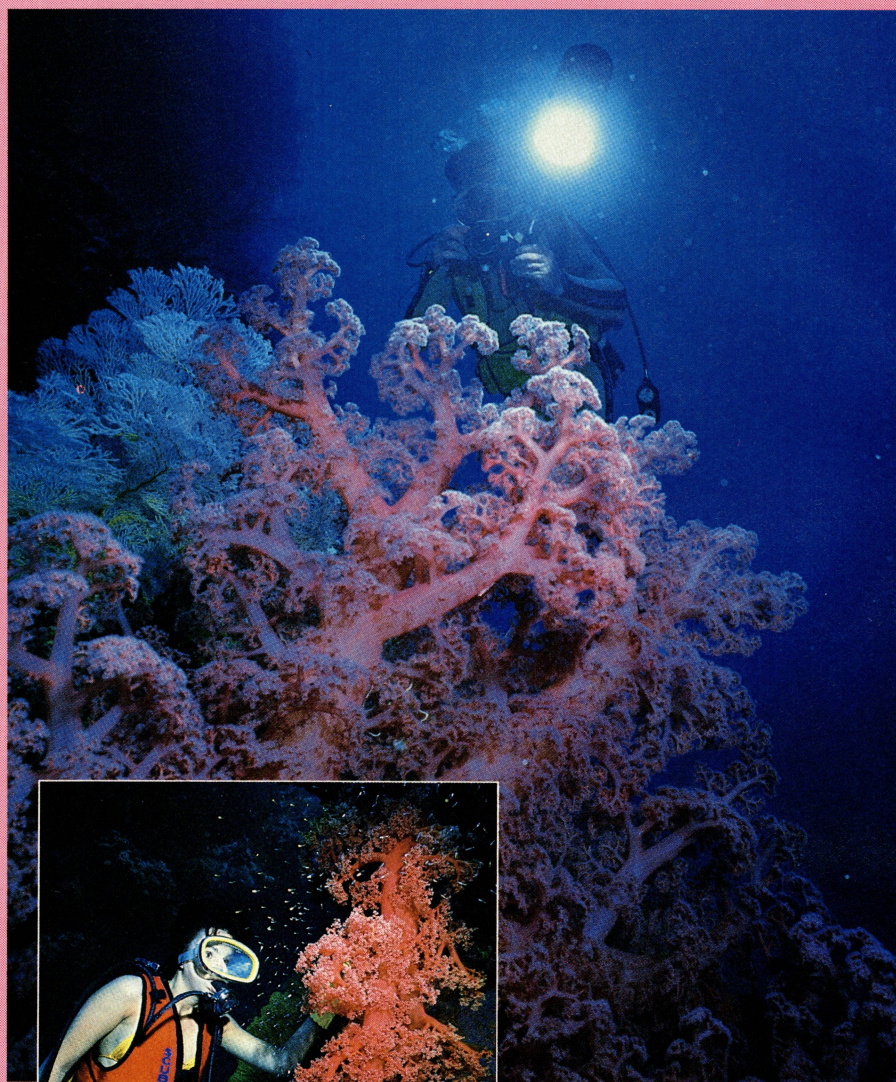
Aboard this floating pleasure dome we now cruised through the Barrier Reef and into the Coral Sea. Over the course of the next ten days we cruised north to Flinders Reef, Dart Reef, Holmes Reef, Bougainville Reef and finally Osprey Reef. From there we returned to the Barrier Reef due west of us and on to Lizard Island. All of these reef areas have splendid diving; but for this narrative the highlights will mark the passage.

At Dart Reef we cruised along the edge of the surface coral so close that we could have lept off the ship and onto the coral. At the edge, just a few feet off, our fathometer ran out of soundings. The drop-off is said to be about 3000 feet and the scene is quite spectacular.

Our best shark action was at Osprey Reef where John Bound has conditioned

the sharks to being fed by hand (at the end of a spear). Baits are prepared and a single speared fish is usually enough to telegraph our presence on the 90 foot deep shelf where John takes his position. It was here, waiting for the action, that I had my first encounter with a dog-toothed tuna. This ragged warrior came straight in from the blue, face-on and all teeth, a rather alarming visitation if you're not prepared for it. His burnished silver skin was heavily scarred, much like battered armor. He circled the camera position, as well as the peanut gallery watching the action from higher up the slope, and passed by within an arm's length, arrogant and fearless.

We orchestrated the usual frenzied feeding by reef whitetips and a fine gray reef shark and capped the action with a splendid performance by an eight foot sil-



Above: A diver photographs a huge, pink soft coral colony at Bougainville Reef. Left: A large soft coral colony surrounded by tiny baitfish.



Above and top right: Divers explore the wreck of the *Antonio Terabocchi* in shallow water on Bougainville Reef. The wreck is partially above water (right) and attracts a variety of marine life.



photos/Geri Murphy

vertip. This lovely shark first carefully scouted the turf, eyeballing the bait but planning his attack and making sure of his perimeters. When he finally made his move I also swam in for the close shot. He grabbed the bait and, making his exit, rolled right over me. I fended him off with the camera and light, shooting all the while. At the same time, David Loughnan filmed both of us with my other camera. We had two dynamic angles, one at actual contact and the other with perspective. This is a lovely action sequence in the film which is called, incidentally, *Rough It in the Coral Sea*.

Other highlights included handfeeding the wonderfully fat potato cod that weigh 150-200 pounds each. Four or five at a time jostle one another for the goodies. This is dependable action at the Cod Hole, just inside the Barrier Reef opposite

Lizard Island. And, right in front of the lodge at Lizard Island is a bed of giant *Tridacna* clams, which were probably there and already giants when Captain Cook landed at Lizard more than two centuries ago.

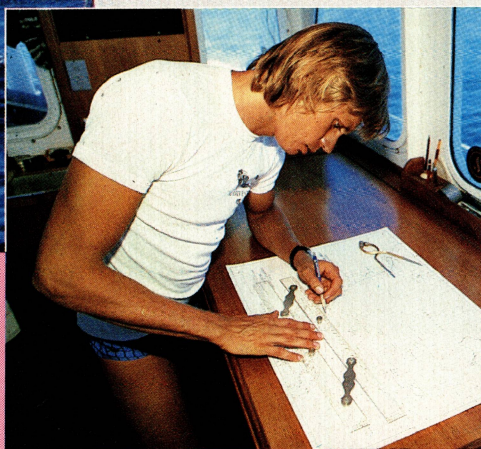
The last dive and the last unusual action was by no means the least. At Heron Island, which is at the southernmost tip of the Barrier Reef, one of the lady dive-masters (or divemistresses, if you will) played with the biggest brown moray I have ever seen. They claim the eel is a full eight feet. I never saw him out of his hole. Even if there's some hyperbole in the statement, the eel's size is formidable, to put it mildly. He proved no more ferocious than his kin in all the world's oceans and succumbed to Cindy Telfer's gentle handling and, of course, the promise of food. She massaged his neck,

reaching deep into the hole to pull him out. I could almost hear him moan with pleasure and thought I saw steam coming out of his ears. He was an old-timer with cataracts on his eyes and probably mostly blind. He's not the first senior citizen to find comfort in the twilight arrival of a beautiful nymphette.

So when I'm asked about the best diving I've ever had my comments will be well influenced by the memory of a Chateau Rothschild '68, poured by a pneumatic hostess on a pleasure barge that makes first class on the *Queen Elizabeth II* seem like a crossing on the Staten Island Ferry. But then, if you have just read of my adventures on this trip you may agree that the diving stands well on its own merits. Put the diving and accommodations together and you have such stuff of which dreams are made.



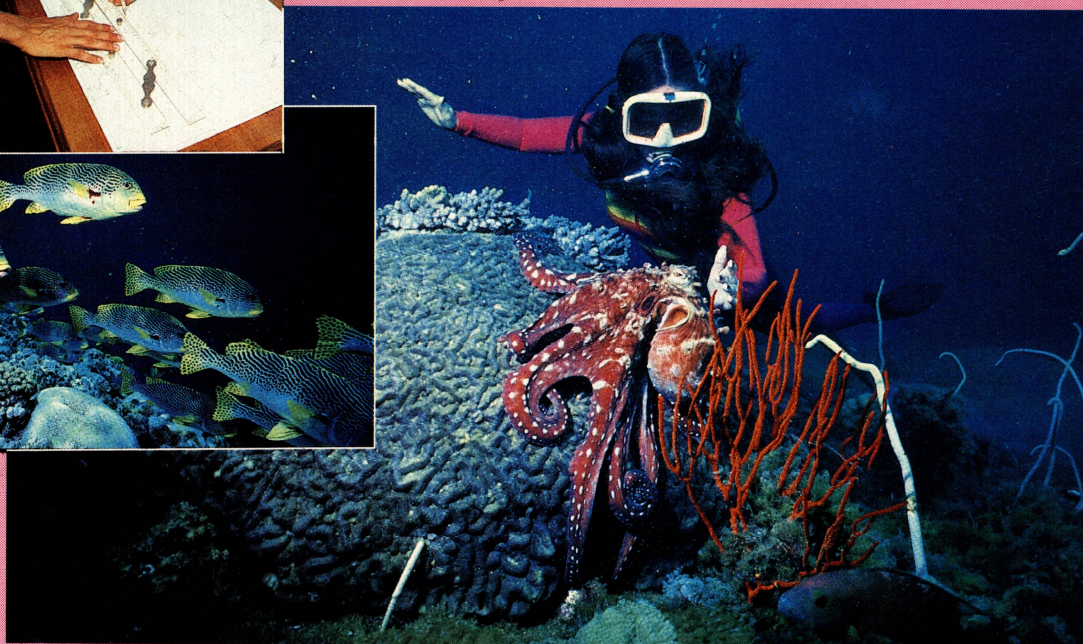
The Reef Explorer carries divers in full comfort to the reefs of the Coral Sea.



photos/Geri Murphy



Top: Skipper Kerry Pietsch charting.
Above: Striped sweetlip, Dart Reef.



Near the Yongala wreck, Jessica Roessler plays with an octopus on a coral head.

Southern Coral Sea

TEXT AND PHOTOGRAPHY
BY CARL ROESSLER

Every October, as regular as the planets in their eternal orbits, spring-time comes to the colossal open expanses of Australia's Coral Sea. Sometimes there comes over these thousands of miles of blue tropic water a hush, a calm, a stillness that is like a benediction. When this happens, all of the free-standing reefs far beyond the Great Barrier Reef become unparalleled wonderlands of crystal water, big fish and astonishing drop-offs. And, every October, as regular as the planets in their eternal orbits, somebody notices I am not at my desk in San Francisco. It takes little profound thought to guess that for the 12th straight year I am escorting another group to this South Pacific paradise.

Over the years we've learned a lot about these remote reefs up to 250 miles off Australia's Queensland coast. For the first few years we traveled only to beautiful Marion Reef, one of the crown jewels of international dive travel. Then we realized that all of the Coral Sea's isolated, open ocean reefs had special qualities no diver should miss.

From this new knowledge has evolved a diving odyssey—See & Sea's Grand Tours of the Coral Sea. A place as dazzlingly varied as this deserves to have each of its unique wonders sampled. Some reefs have stupendous drop-offs, others life filled pinnacles, others concentrations of seldom seen marine life such as sharks and sea snakes.

All of our Grand Tours begin with a two day sojourn in sophisticated Sydney, where we enjoy a superb wine tasting, visit the Opera House and the Centre Pt. Tower, and sample some of Sydney's choicest restaurants.

After our Sydney sojourn we fly northward some 1000 miles to the charming resort city of Townsville. Here we board one of Australia's premier dive boats, the *Reef Explorer*. I've now personally made six of these sensational trips on *Reef Explorer*, and her strengths are prodigious. Her guest cabins include six air-conditioned rooms for two; she has hot water showers, a roomy area for donning dive gear, a roomy salon, a window-wrapped bar and all the latest sophisticated electronics including sidescan sonar and satellite navigation.

Her crew, though, is her major asset. Captain/part owner John Bound and his ebullient wife, Penny, lead an all-star

team which includes Captain Kerry Pietsch. These are veteran Coral Sea skippers who know all the greatest sites. Add to this line-up Australia's most gracious and charming hostesses (who are also fabulous cooks) and the Grand Tours are in the very best of hands.

Departing the afternoon of our Townsville arrival, we steam through the night right through the Great Barrier Reef to its very outer edge. Here we'll stop for most of one day of diving.

After another overnight crossing we find ourselves some 250 miles out to sea at the colossal reef named for the Australian explorer Captain Matthew Flinders. Flinders Reef is a kaleidoscope of undersea experiences—great cities of coral pinnacles rise to within a few feet of the surface here and there across the entire 15 mile lagoon. There are huge valleys filled with golden gorgonians between these pinnacles, and some have their shallow tops wreathed with thousands of flashing tropical fish.

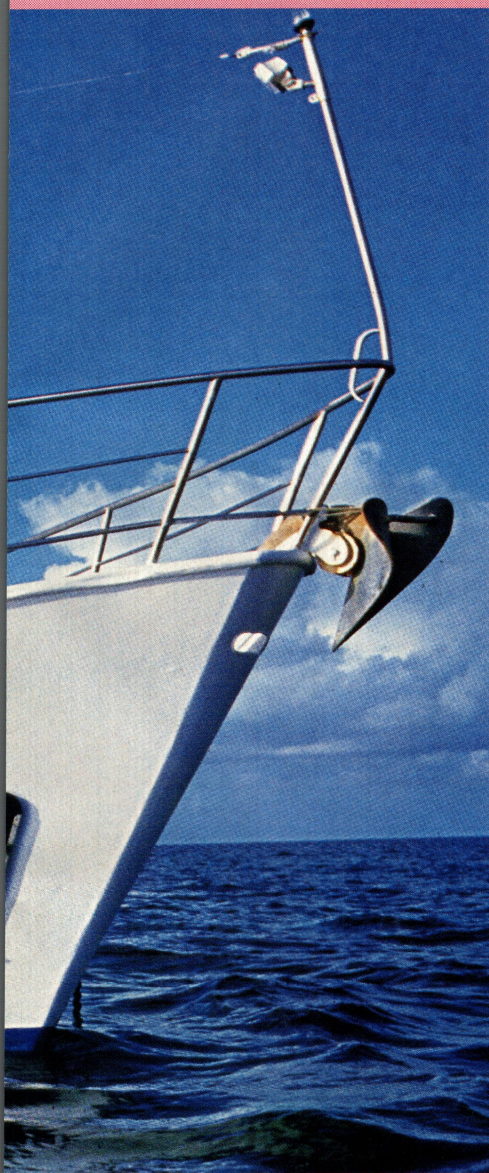
At the astounding pinnacle we call The Jinx (from two years ago when several cameras flooded here) the water was so still one could sit on the bottom and photograph the *Reef Explorer* floating above. Sometimes the quality of the diving experiences at these Coral Sea reefs exceeds the power of words; the lushness, the clarity, the sense of spacewalking. Awe and majesty live here.

There are big drop-offs at Flinders, too, on the southern reef extension, but when anyone mentions drop-offs out here the answer is, "Let's go to Dart." Dart Reef lies two hours northwest from the bommies of Flinders. It is an undersea mountain with vertical sides abruptly ceasing just beneath the limpid surface of the water. This drop-off is awesome, dwarfing those of us who soar down its flanks.

Below 100 feet are scattered soft coral colonies that sometimes stand four or five feet in height. Jessica and I were taking modeling shots with those rose, yellow and purple behemoths when we were interrupted first by a patrolling silvertip shark, then by a turtle and finally by a bevy of divers homing in on the same huge corals. Indeed throughout the entire 12 day odyssey, divers are shuttling in and out of the water constantly. *Reef Explorer's* aft deck becomes a kind of revolving door, with those going, briefly chatting with those returning, giving directions to special locations. There is an air of excitement—no one wants to miss anything.

Our next overnight brings us to legendary Marion Reef. Marion has pinnacles similar to those of Flinders. While some of Marion's are not as spectacular as some of Flinders', Marion's have an added dimension, for this is the home of the sea snake.

The snakes' reputation, naturally, is based on their venom and people's natural fear of such a well armed creature. After a day or two constantly diving with these very special animals our divers find



A large colony of yellow soft coral.

See & Sea's Grand Tours of Australia's Coral Sea

See & Sea's exclusive Grand Tours—odysseys of adventure among all the greatest reefs of the Coral Sea. The Northern Grand Tour visits the wonders of Flora, Holmes, Moore, Bougainville and Osprey Reefs, and the incredible Cod Hole, where 20 giant groupers await your camera.

The Southern Grand Tour offers Dart, Flinders, Diamond and Marion Reefs, plus the astonishing concentration of marine life on the wreck of the Yongala. Swim with turtles, rays, huge tuna, giant groupers, sharks, sea snakes—the world's most exciting reefs one after the other; and the ultimate dream of avid underwater photographers.

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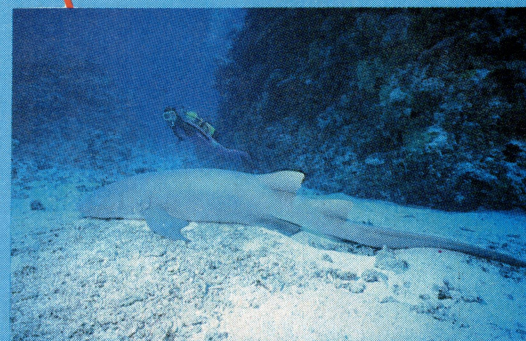
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Shark Reef



Bougainville Reef

Holmes Reef

Flora Reef

Dart Reef

Flinders Reef

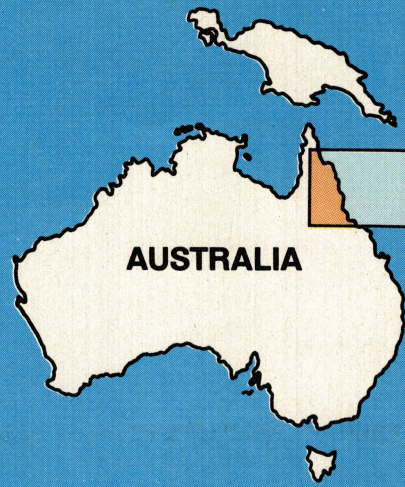
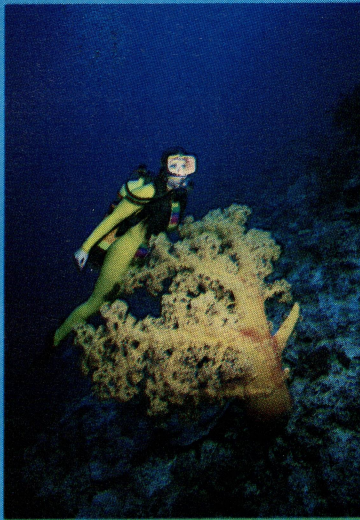
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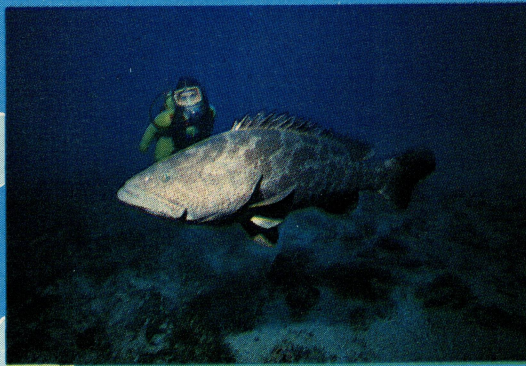
TOWNSVILLE

Yongala Wreck

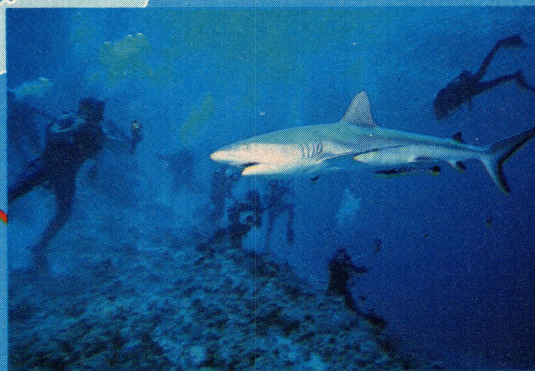
Approximate outer edge of the
Great Barrier Reef



Moore Reef



Diamond Reef



Marion Reef



Southern Coral Sea

them to be inoffensive, curious, even gentle. Soon some of the most timid divers are asking to have their pictures taken handling a snake. I'm delighted to do it, of course, though I sometimes wonder whether these pictures will go home and be used to scare the woolies off another generation of divers. I can hear it now—"Snakes to the right of me, snakes to the left of me"—shades of Indiana Jones. It's all lies, folks. It's like saying Smokey the Bear is a mad arsonist.

At all Coral Sea reefs there are populations of gray sharks, and Marion has one reef where over the years we've fed a pack of some 20 of these beautiful animals. As with the snakes, at the end of the hour our divers have increased their respect but lost their fear of these misunderstood sea creatures.

After three or four days around Marion, we carefully save our final full diving day for the totally unique adventure of the *Yongala* wreck. After a long overnight cruise, *Reef Explorer* uses her sophisticated electronics to find this lost marvel of Australia. *Yongala* is more than a wreck, it is a shrine of marine life. Like an African waterhole, it is a place where the laws of the jungle are suspended, where the lion and the lamb lie down together.

Yongala is some 300 feet in length, large enough to shelter multitudes and so it does. There are immense shoals of snappers and grunts in her shadows, and in the shallow waters above her expired bulk one can hover over hundreds of barracuda, batfish, golden trevally, cobia and other open water species.

But the *Yongala* has much more. By mid-afternoon, eight colossal sea bass of 500 pounds or more each come to hover under the bow. There are several tame rays, which soar unconcernedly along watching our frantically snapping photographers. There are turtles, octopus and a wonderfully tame sea snake.

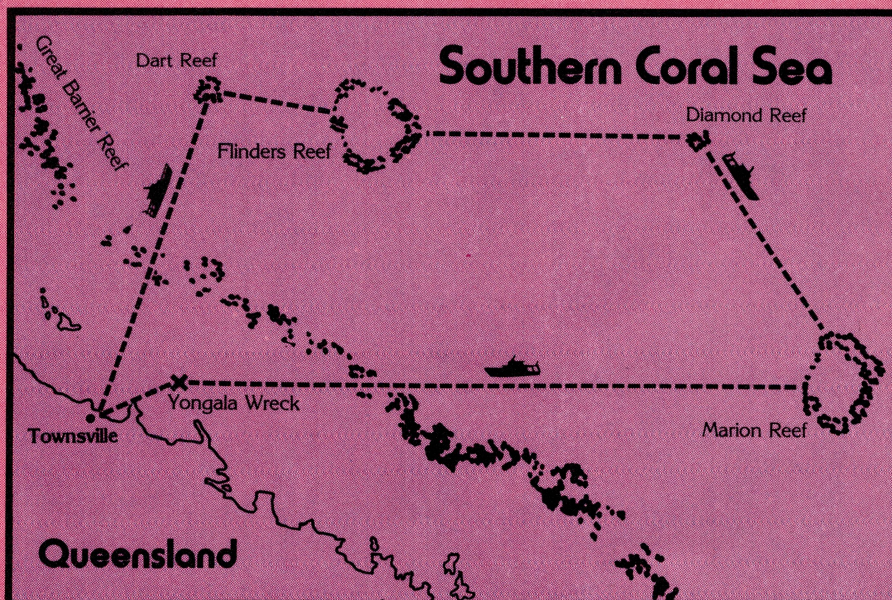
On one of our 1982 trips Jessica found an octopus and played with it for a quarter-hour while Stan Waterman and I photographed. That octopus couldn't know that he will be an underwater film festival star this season.

Yes, the Grand Tours of the Coral Sea are like a string of rare pearls, matched in quality but each unique. Some of our dive clients have made two or three of these adventures with us, and for them there is great news for 1983. We are about to launch our new Northern Grand Tour, starting September 30. Modeled on



photo/Carl Roessler

Exciting encounters with sea snakes are common on the cruises into the Coral Sea.



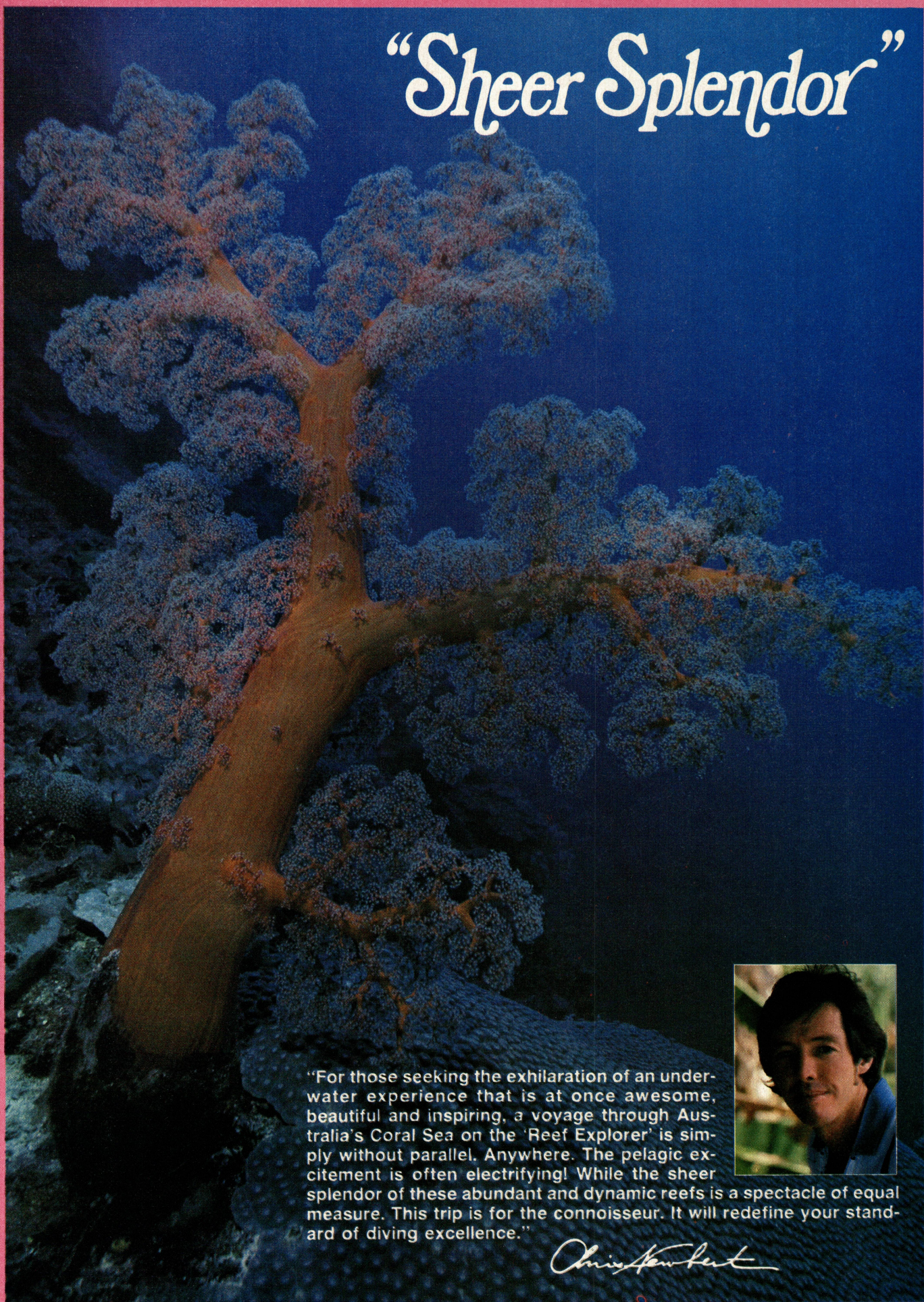
The chart above traces the Grand Tour of the *Reef Explorer* in the Southern Coral Sea.

our Southern Grand Tours, these 12 day cruises will touch the most spectacular reefs of the Northern Coral Sea. Departing from Cairns, we'll cruise out to Holmes Reef, then to remote and fabulous Moore Reef (which boasts an entire cavern filled with flashlight fish), Shark

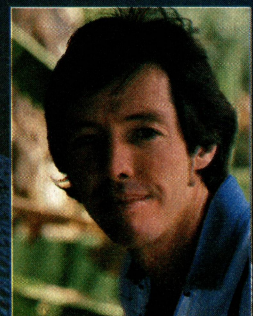
Reef, Bougainville and Osprey Reefs; we'll finish by diving another animal sensation, the astonishing Cod Hole, where up to 20, 200 pound groupers come to explore our divers.

About my next 20 Octobers— don't call me, I'll call you...when I get back!

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Chris Fawcett

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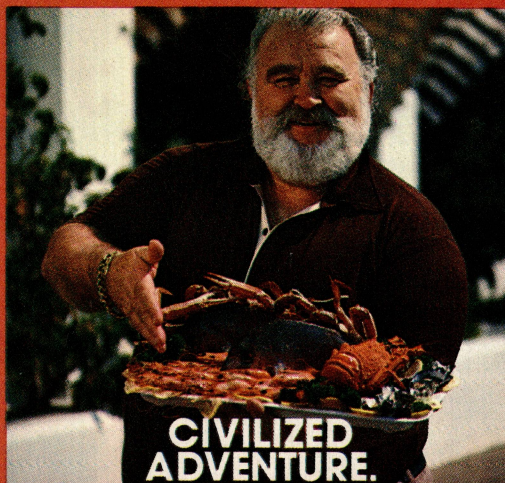
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Medical Examination of Sport Scuba Divers is a new publication available from Medical Seminars, Inc. of San Antonio, Texas. This set of guidelines was developed during the past year by a multispecialty group of 100 diving physicians. It

Medical Examination of Sport Scuba Divers

Jefferson C. Davis, M.D.
Editor

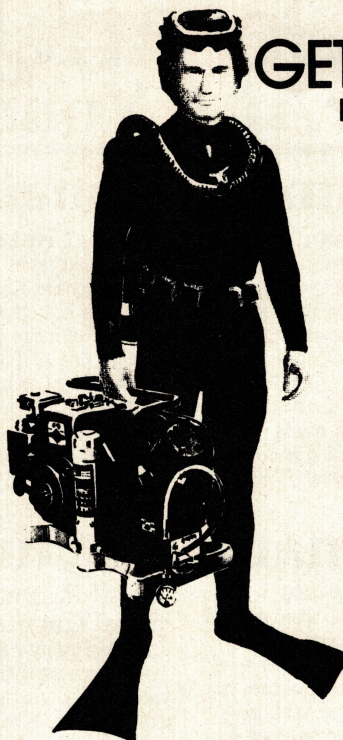
provides current medical opinions on commonly asked questions regarding fitness to dive safely. The publication was edited by Jefferson C. Davis, M.D. The work's reviewers were A.A. Bove, M.D., medical advisor to SKIN DIVER Magazine; J.C. Farmer, M.D. of Duke University; Richard H. Strauss, M.D. of Ohio State University and L.M. Neblett, M.D. of Springfield, MO.

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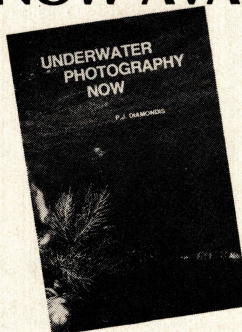
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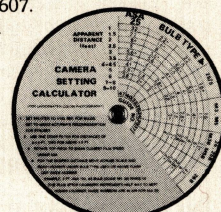
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Cayman

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Cayman Brac

Brac Reef Hotel

Now, direct flights from Miami make the Brac's wall diving even more accessible. The Brac Reef is the island's most modern hotel, featuring 30 ocean-front rooms, pool, tennis, sailing and fine restaurant. Winston Mc Dermott's Brac Aquatics offers unlimited diving, plus a trip to Little Cayman.

Roatan

Anthony's Key Resort

Roatan, one of the Bay Islands of Honduras, is a tropical paradise reminiscent of an earlier Caribbean era. Anthony's Key, looking more like an island plantation than a resort, provides cottages with comfort, privacy and delightful view. Virgin blue water from the Gulf-stream trench, two miles deep, is propelled over the 30-mile barrier reef, and proves the ideal location for Peter Hughes' DIVE ROATAN.

Bahamas

South Ocean Beach

Located only a few miles outside the hustle and bustle of Nassau on the south shore, this top-rated resort faces Bahamas 4000 meter deep Tongue of the Ocean, with a wall that starts at less than 45 feet. The hotel amenities are superb, including dining, tennis, wind surfing, sailing and championship golf course.

Cayman

London House

What better way to spend a Grand Cayman dive vacation than in a handsomely designed resort apartment with every convenience - two bedrooms/baths, kitchen & living room, facing the ocean - ideal for diving couples and families. Located on Seven Mile Beach, this package features superb Cayman diving with Bob Soto. Roundtrip airfare included in the low season rate.

Cozumel

La Ceiba Beach Hotel

Cozumel's favorite dive hotel and resort, combined with Fantasia Divers, make this the best diving package on the island. Paradise Reef, just offshore, and Palancar Reef, only twenty minutes away offer breathtaking beauty. Beach-front accommodations, pool, unlimited beach diving and choice of restaurant.

Turks & Caicos

Hotel Kittina

The most spectacular dives in Grand Turk involve the 7000-foot drop-off paralleling the leeward shore. Located on this truly unexploited island, the Kittina offers 22 spacious rooms on the beach and features Mike Spillar's Turks Island Divers with a 32' flattop and full service dive facility.

Bonaire

Habitat Resort

This popular resort captures the mood of Bonaire. Your own private cottage is just steps away from Captain Don's new dive center in front of one of Bonaire's most popular reefs. Complete certification course and U/W photography facility. Good food, good friends and unlimited diving.

Cayman

Royal Palms & Coral Caymanian

The Pick of Cayman! Skin Diver says "these hotels are right on the beach and are perfectly suited for sunbathing, swimming, sailing, snorkeling and of course, scuba." Located in the heart of seven mile beach, Don Foster's DIVE GRAND CAYMAN offers personalized service. Roundtrip airfare from Miami included in this special package.

Florida Keys

Port Largo Villas

Key Largo's Pennekamp Park... more than 40 species of coral, 650 varieties of tropical fish, and your own luxury two bedroom villa... complete diving package with Joe Clark's Ocean Divers. Resort and certification courses, plus underwater photography with Stephen Frink.

Turks & Caicos

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Your dive vacation is keyed to formal relaxation on the private island of Pine Cay, with beach front suites, freshwater pool, excellent cuisine and impeccable service. The dive operation is personalized and just minutes from shore you'll discover exhilarating drop-offs, blue holes, virgin reefs, caves and canyons.

Bonaire

Flamingo Beach Hotel

This 110-room resort hotel, a few minutes from the airport, a short stroll to town is the home of Peter Hughes' DIVE BONAIRE. More than 40 dive sites, plus Bonaire's incredible beach diving. Underwater photo course and developing. Afterwards, relax in the freshwater pool or jacuzzi.

Cayman

Spanish Cove Resort

A Caribbean diver's paradise that's in a class by itself is the only way to describe this fabulous resort. Just minutes from George Town and Seven Mile Beach, you are treated to world-class diving on the North Wall. State-of-the-art dive center, photography and instruction make this the best that Cayman has to offer.

Jamaica

Jamaica Hilton

Sea & Dive Jamaica with Mike Drakulich. This special low season package gives you the best Jamaican diving on the island's North Coast at the Jamaica Hilton in Ocho Rios. Afterwards, enjoy Waterfalls, and Rivers, Lush Gardens, Dining, Discos, and Dancing, Pool and Entertainment. Jamaica is a must for every diver and non-diver this year.

Virgin Islands

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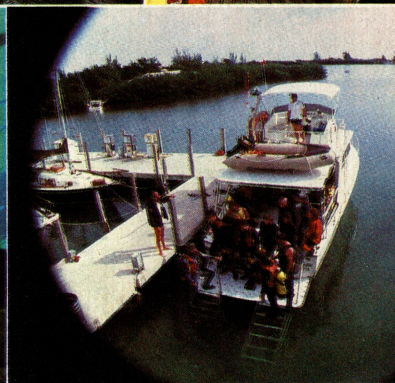
SDM travel

SECTION

MARATHON'S NEW DUO

Holiday Inn & Divers Unlimited

Text and Photography
by Steve Lucas



In diving there are a few names in both resorts and personalities that come to mind when innovators are thought of. Dave Inman is definitely one of these. And, down in America's tropics, the Florida Keys, a new Dave Inman total dive resort is working its way to the top of the list of superstar dive destinations. Inman is president of Divers Unlimited of Hollywood, Florida, the only store to be named PADI's number one training facility three years in a row. The store certifies

more students than any other retail operator per year and sells nearly twice as much merchandise as any other dive shop.

Inman's business savvy has now been turned full force into creating a well organized, Caribbean style dive resort to which anyone in North America can drive or fly. Inman has joined forces with the Holiday Inn-Marathon and built an entirely new mini Divers Unlimited on its premises. To announce its opening on Key Colony,

near the Middle Keys, and encourage divers to drive an hour past Key Largo, Inman offers some very attractive rates. There is a \$38 per day package (double occupancy) through 1983. For that remarkable price you can make two boat dives per day and spend your evenings at a Holiday Inn, which has undergone a total face lift to make it a true diver's resort.

The location is near perfect. The upbeat tempo of Miami with all its marine related attractions and International Airport is just a few hours to the north while Key West with its special offbeat ambience and atmosphere is a close drive to the south. Within the vicinity of the hotel are a large number of diversions for divers and non-diving guests: Jet Skis; helicopter rides; bare

travel

boat sail charters; sport fishing; seaplane rides to Fort Jefferson in the Dry Tortugas; and an excellent array of fine restaurants can be reached quickly, most with a short walk. The Holiday Inn's facilities are some of the best in the Keys and it offers excellent dining, quality evening entertainment featuring calypso beat dive songs like those heard at the best known resort islands, as well as more traditional Keys night life and music. An excellent pool deck, which overlooks the marina and harbor, and bar with a palm leaf thatched roof, can quickly make you forget you are not 1000 miles deep in the Caribbean.

The dive operation is also among the finest in the Keys. Guests can be at the dive shop a minute or two after leaving their rooms. The boats are run with an interest in diver creature comfort. Tanks find their way to and from the boats without any muscle power from guests. The slips are located directly beside the hotel shop.

With two quick 42 foot, 24 passenger boats, the *Dolphin One* and *Dolphin Two*, runs to the reefs are reasonably short. The diving rivals many islands—a 60 to 100 foot sheer drop mini-wall loaded with sponges, fish, and deep water marine organisms has even been discovered, a definite oddity in the Florida Keys. This type of diving, combined with the more traditional Keys reefs, gives you a much broader spectrum of dive options than is normally experienced in this Florida island chain. Inman's approach to diving is certainly more islandish than the majority of Keys dive boats. Trips regularly include both deep and shallow excursions, and are not limited to the 30 to 40 foot style of diving that Keys visitors have grown to expect.

One thing Inman has taken a practical approach to is spearfishing. Special reef areas have been set aside for that aspect of sport diving. The chefs at the Holiday Inn have made special arrangements to prepare the catch to order and serve it the same evening. Spearfishing trips are run only on special request when most of the divers are interested in it, however. They are not a normal part of the regular dive schedule. Most of the reefs have been declared off limits to spearfishing and guns are locked up in these areas.

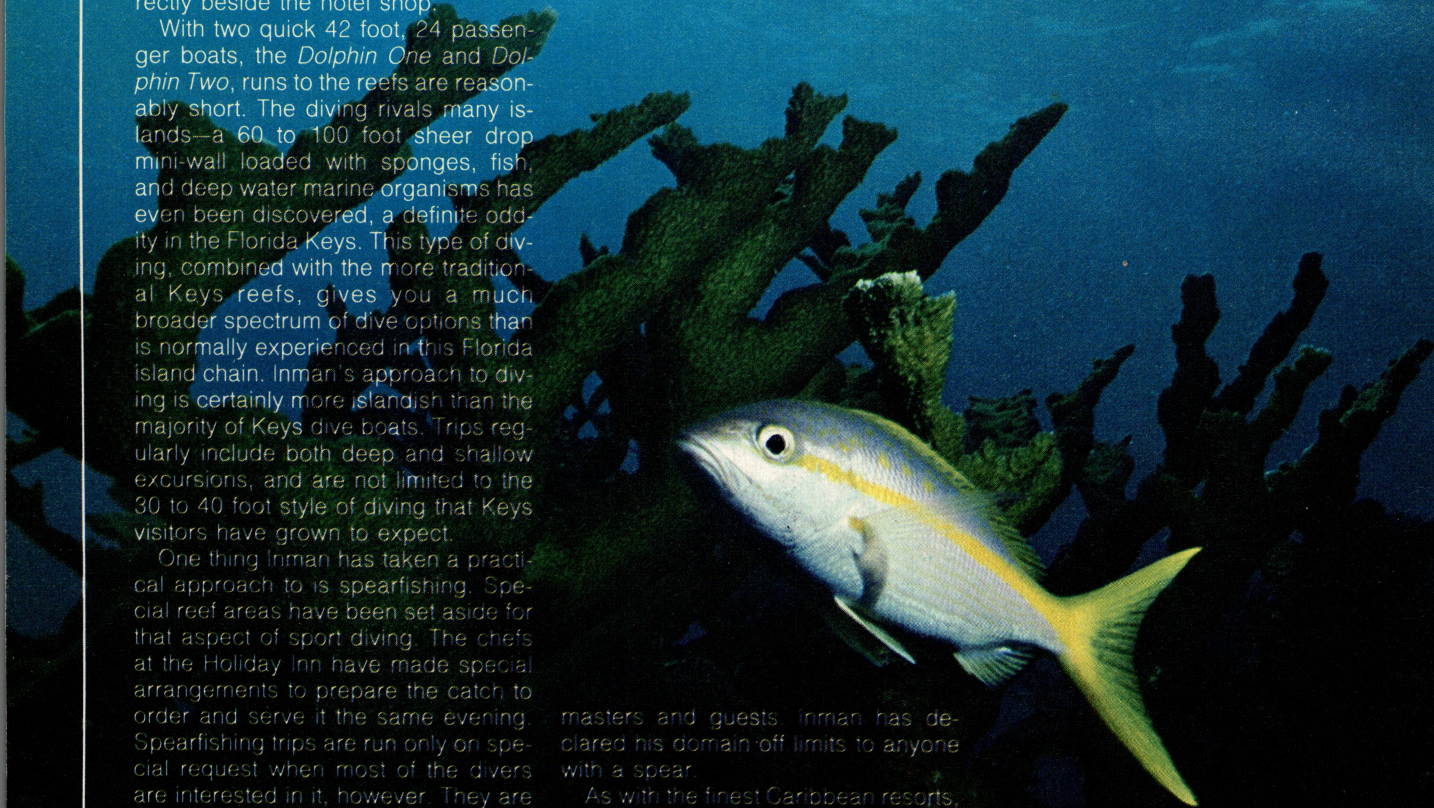
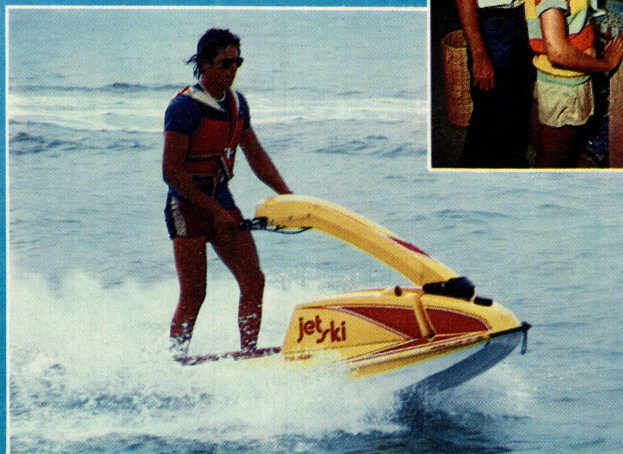
One very special site is home to a large friendly jewfish in the 100 pound class. This fellow is now considered rare in the Keys and has readily taken to being handfed hotdogs by the dive-

masters and guests. Inman has declared his domain off limits to anyone with a spear.

As with the finest Caribbean resorts, Divers Unlimited has made every effort to make reserving your trip to the Florida tropics easy. A toll free reservation number can book you into the resort next week or next month: (800) 327-2740. In Florida the number for reservations is (305) 981-0156. Special packages can also be arranged for divers wishing to fly into Miami or

Ft. Lauderdale. Divers Unlimited can arrange a car rental to be included with your package at a special reduced rate. With service like that and a price of \$38 per night, including diving, you may decide that the islands are much closer and easier to reach than you had previously thought. >>>

Right: The Divers Unlimited/ Marathon dive shop. Below: Riding Jet Skis is just one of the diversions available near the Holiday Inn-Marathon facility. Bottom: Exciting diving is just a short run from the hotel shop.



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- ☐ Sounds interesting. Send more information.

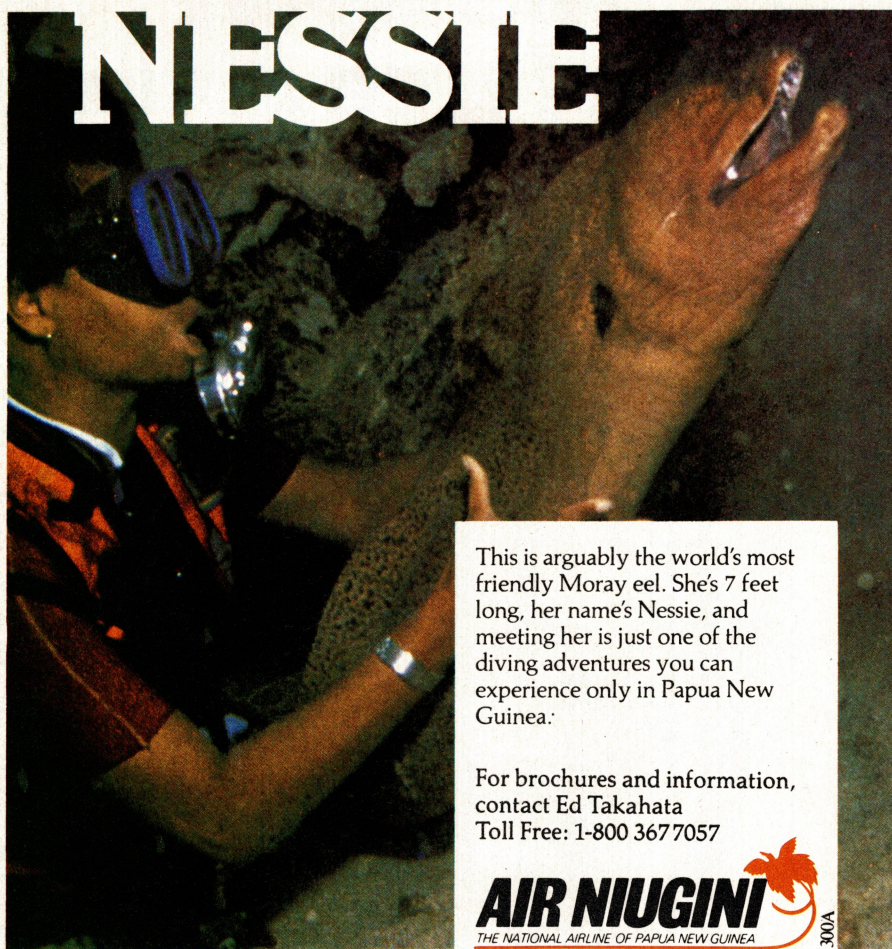
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For brochures and information, contact Ed Takahata
Toll Free: 1-800 367 7057

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THE NATIONAL AIRLINE OF PAPUA NEW GUINEA

KIPP WEDDING

Just because it wasn't the biggest wedding of 1982 in Grand Cayman doesn't mean it wasn't one of the best. In fact, the only thing missing from the nuptial ceremony was a night dive on the *Balboa* for the bride and groom.

The occasion was the marriage of Bob Soto's Diving Ltd. president Ron Kipp



and Soto's public relations and marketing director Kathie Nicholson, which took place December 30 aboard the 102 foot luxury yacht, *Pelorus Jack*. Joining in the celebration were family and 100 guests, including the Barefoot Man and Band, who played a medley of rock and dive tunes during the reception.

Kipp purchased Bob Soto's Diving Ltd. from Bob Soto in 1980, and the firm celebrated its 25th anniversary this year.

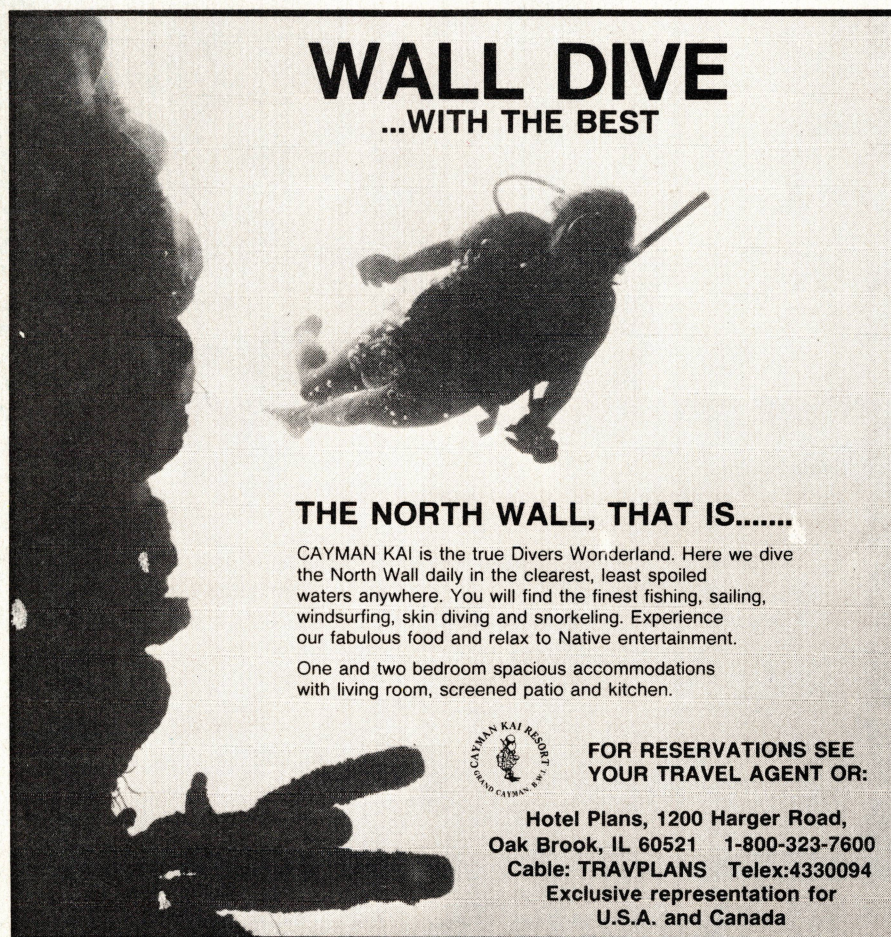
COBER JOINS CUA

Sandra Cober has joined Don Foster's Cayman Undersea Adventures. She is a YMCA instructor, PADI assistant instructor, and an American Heart Association CPR instructor.

Cober will be in charge of full certification courses, resort courses, dive guiding on the boats and will also work in the retail dive store.



For more information or reservations, contact Don Foster's Cayman Undersea Adventures, P.O. Box 151, Grand Cayman, B.W.I.; (809) 949-2636 or their stateside representatives, toll free, Divers Unlimited (800) 327-2740, or Ocean-Quest (800) 526-1394.



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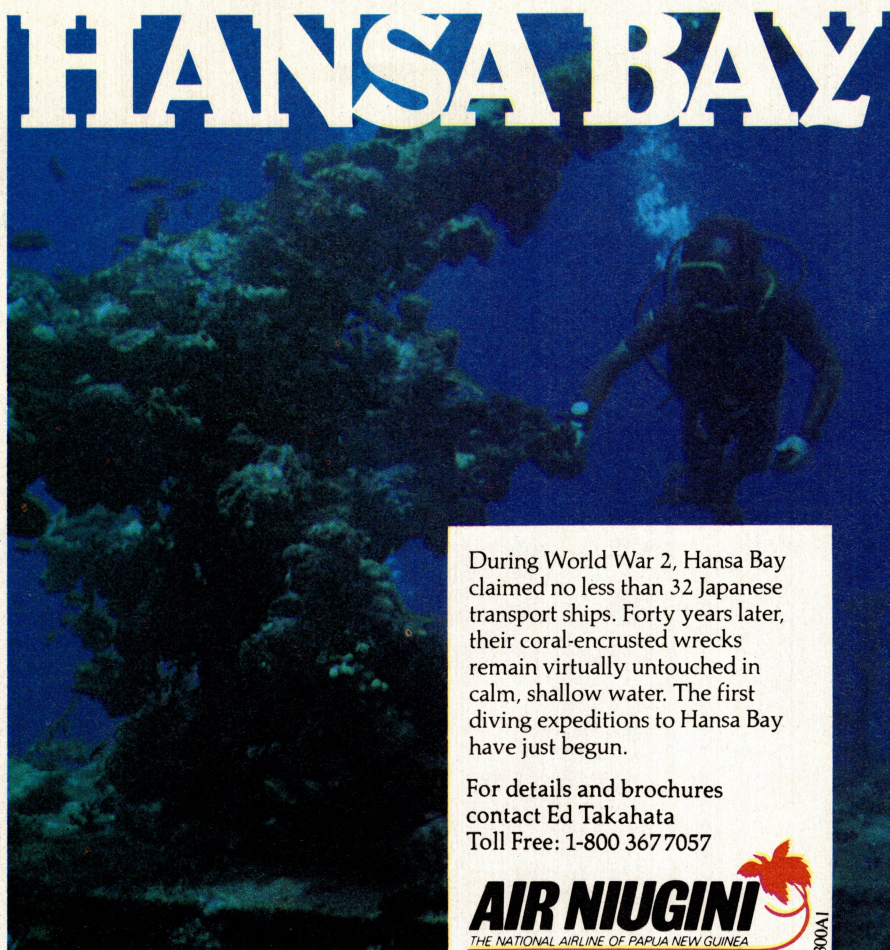


Photograph by Jim and Cathy Church

A fantastic variety of excellent dive sites by day. A fantastic variety of restaurants and clubs by night. For a copy of our 24-page Dive Guide, write: United States Virgin Islands Division of Tourism, P.O. Box 471269, Miami, FL 33152.

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have it all.”** *Jim and Cathy Church*

HANSA BAY



During World War 2, Hansa Bay claimed no less than 32 Japanese transport ships. Forty years later, their coral-encrusted wrecks remain virtually untouched in calm, shallow water. The first diving expeditions to Hansa Bay have just begun.

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CAYMAN KAI

Cayman Kai, on Grand Cayman's quiet north coast, has expanded its watersports facilities to offer more recreational opportunities. These include sportfishing, with half and full day charters available aboard the 25 foot deep V-hull *Way Out* and 36 foot custom diesel sportfisherman *Way Out II*.

Sunset cruises aboard *Way Out* are scheduled for Thursday evenings, leaving from the resort's dock at Water Cay.

Cayman Kai resort has added a new 34 foot custom Bristol Blue Water flattop dive boat to its fleet. This 14 foot wide vessel, *Pirate One*, will be the flagship.

Cayman Kai is now offering lower rates for dive packages during the 1983 season. The resort has two packages, one with Modified American Plan or Full American Plan, and one which includes only accommodations and diving. Rates are available on request.

Cayman Kai also plans to add five Sunfish sailboats, a Hobie Cat and boardsailers to its watersports attractions.

For information and reservations, contact Cayman Kai, P.O. Box 1112, Grand Cayman—U.S. toll free (800) 323-7600; local phone 79556.

AQUATIC CENTRES

Bob Turrentine has recently been hired as general manager of the Aquatic Centres on Tortola. Originally from San Diego, CA he is a NAUI instructor and has been a practicing attorney in Minnesota for the past eight years. As general manager, he will coordinate the Aquatic Centres' dive operations.

PINE CAY PACKAGE

OceanQuest now offers special group discounts to the Meridian Club on the island of Pine Cay in the Turks and Caicos Islands. This dive vacation includes: eight days/seven nights accommodations at the Meridian Club; breakfast, lunch and dinner daily; transfers; on-island transportation; and 12 boat dives. Air fare from your city of departure is extra, and OceanQuest has special fares available in conjunction with Air Florida.

DREAM WRECKS

SeaVentures International Inc. owner of the *Impossible Dream*, has added a wreck to its dive sites in the Nassau area—a 70 foot steel trawler that was sunk for use in a new James Bond film. The vessel *Tears of Allah* awaits the divers that make Nassau *Dream* trips.

SeaVentures has also added the latest 300 foot freighter sunk off the Lucayan Caves area to its trips to Grand Bahama.

For information write SeaVentures International Inc., P.O. Box 3271 Indianantic, Florida 32901 or call (305) 723-9312—Dan or Inez Wagner.

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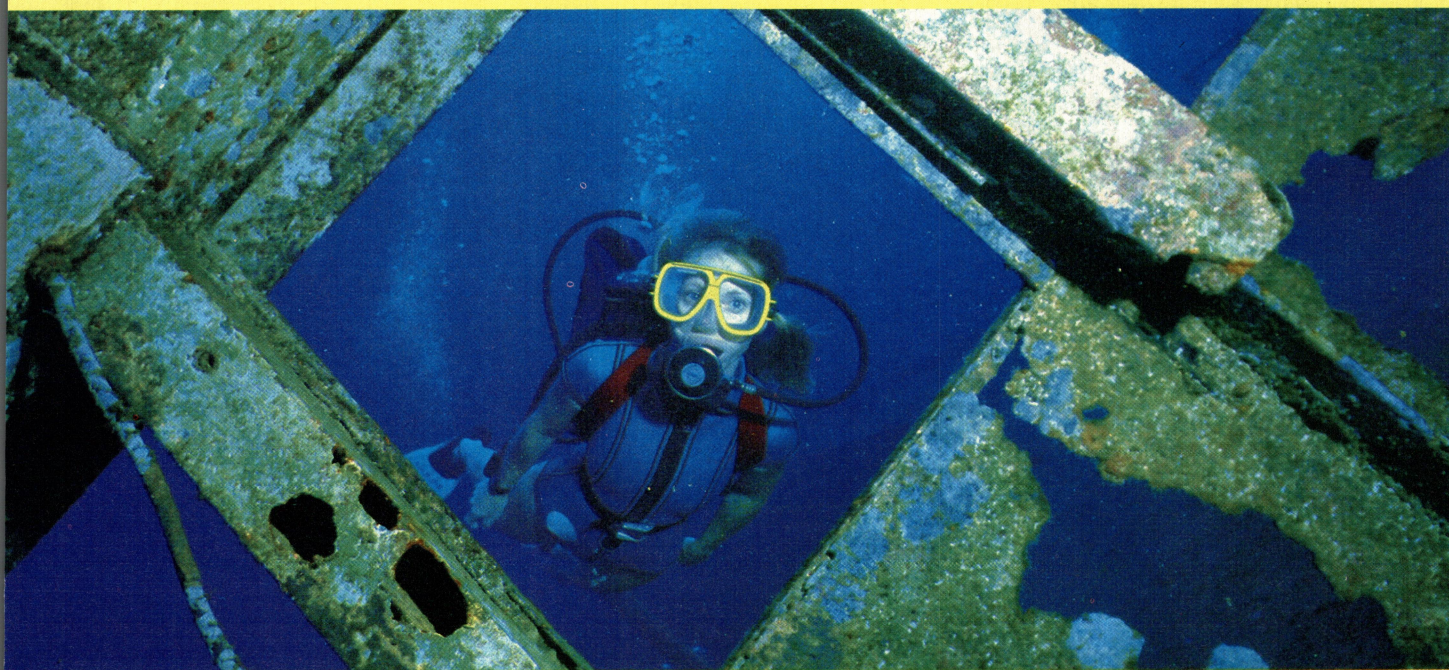
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WALKER'S CAY PACKAGE

Aqua Adventures is offering a new three night/six dive package at Walker's Cay Hotel and Marina in the Northern Bahamas. The trip includes two meals daily. Walker's Cay is reached by flying from Ft. Lauderdale on Walker's Cay Airlines.

For reservations and information, contact: Aqua Adventures, Inc., 390 Fifth Avenue, Suite 502, NY, NY 10018; or phone (212) 563-5700.

BIMINI COURSES

The Undersea Photographic Instructor's College, in association with Neal Watson's Bimini Undersea Adventures, is now offering basic and advanced courses in underwater photography. In addition to these courses, instructor clinics will be conducted to review updated instruction techniques, equipment merchandising and repair.

UPIC's facility, which includes a large classroom at the Bimini Big Game Fishing Club, E-6 film processing and photo boat, is also available to stores that wish to conduct their own courses in Bimini. Year-round course dates are scheduled, featuring such underwater photographers as Steve Lucas, Paul Humann and Richard Stewart.

For more information, contact UPIC at Box 4960, Ft. Lauderdale, FL 33338, or call (800) 327-8150; in Florida, call (305) 564-8644.

BAHAMAS DIVING ASSOCIATION

Dive operators throughout the Bahamas have established an association to promote the entire country as a premier diving destination. The idea behind the new Bahamas Diving Association is to eliminate the existing fragmented marketing approach to the sport.

The association evolved for a dive tourism marketing seminar held recently at the South Ocean Beach Hotel. Elected president of the new group was John Englander, of UNEXSO in Freeport. Dick Birch of Small Hope Bay, Andros, was named vice president and Maura Brassil, Ministry of Tourism sports promotion manager, was elected secretary.

Members then appointed a task force to discuss promotional and marketing ideas that were generated during the seminar. It consists of the elected officers, plus Grover Moberley, South Ocean Beach Divers; Neal Watson, Bimini Undersea Adventures; Tom Ebro, Rum Cay Diving Club; Dick Batchelder, Riding Rock Inn, Ted Caparell, Walker's Cay; Lee Morrison, Family Island Promotion Board; and Lil Campbell, Spanish Wells Beach Resort.

Inquiries should be directed to Maura Brassil of the Bahamas Tourist office in Coral Gables, FL (305) 442-4867.

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Depart Ft. Lauderdale. Come or leave any day. Stay as many days as you like. **Includes:** 3 Dives per day including day of arrival. 2 Dives on day of departure.

2 Days \$195
1 Night as low as per person, double

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Includes: Transfers to and from airport
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PORT LARGO

The idea of the total resort vacation package is not a novel concept within the dive industry. Most of the more successful Caribbean destinations have incorporated similar programs for years. The logic has been that foreign travel can be confusing and time is especially valuable for the vacationer with only one or two weeks available each year. The quality conscious consumer wants to be able to place one phone call and know that his travel contingencies have been covered and a good time is assured.

Even though domestic travel can be equally confusing, complete dive packaging has been slow to come to Florida for several reasons. The easy access and incredible popularity of the Florida Keys has traditionally provided a steady flow of customers to the numerous operators from Key Largo to Key West. But more importantly, the hotels servicing these Keys have enjoyed healthy occupancy levels and haven't felt the need to provide the price concessions implied by a dive/lodging package. Times change, however, and the same economy which intro-

Key Largo's First Complete Dive Package

TEXT AND PHOTOGRAPHY BY STEPHEN FRINK



The Port Largo Villas feature spacious balconies and easy ocean access from canals.



The Villas complex features two jacuzzis and two pools.



Each living area has complete furnishings and two bedrooms.

duced wraparound mortgages and balloon payments to home financing has initiated changes in dive vacation packaging. The results are proving beneficial not only to the dive operator and hotelier, but more significantly, to the traveling diver. This is the story of how one such package evolved and the amenities and service the diver booking the Port Largo Villas/OceanQuest/Ocean Divers package can reasonably expect.

The original concept was initiated by Stuart Marr, an Upper Keys real estate

developer with the intent to build a resort specifically targeted to the more discriminating end of the watersports market.

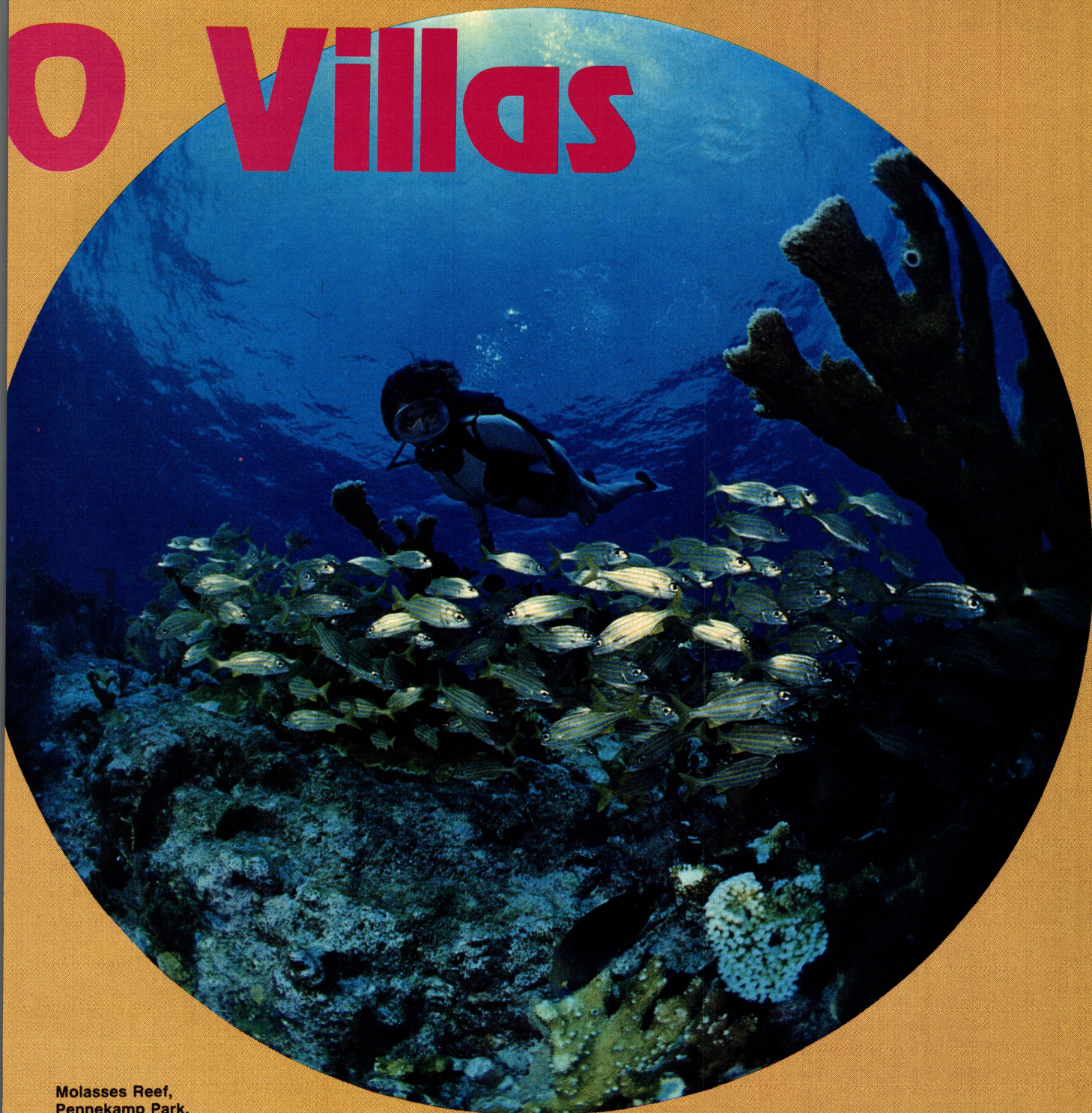
People come to Key Largo because they love the ocean and the nautical ambience of the community. Naturally, these divers, fishermen and nature lovers need a place to stay. The Port Largo area of Key Largo was chosen for a number of reasons. It is a quiet residential area with easy ocean access from deep, clean canals. It is close to fine restaurants and shopping. And, the area is easily accessi-

ble to U.S. 1, the travel artery of the Florida Keys.

From this theoretical base the Marr family built 24 two-bedroom, two-bath units beautifully decorated with wall-to-wall carpeting; central air-conditioning; cable TV; fully equipped kitchens including microwave; whirlpool bathtubs; ceiling fans; spacious balconies; and accessories from corkscrews to hair dryers.

The grounds of the Port Largo Villas complex have been developed in keeping with the luxurious theme established

O Villas



**Molasses Reef,
Pennekamp Park.**

with the interiors. There are two large swimming pools used for scuba instruction and resort courses as well as general recreation, two outdoor whirlpool baths, poolside bar, tennis courts, and boat ramp and dockage. The general layout of the facility makes it especially attractive to families with children because of the two bedrooms as opposed to the one central living area typical of a motel room. Two couples, or really any groups, could occupy one of these spacious units and realize considerable savings both in

terms of money and personal comforts. In addition, the complete kitchen area, with accompanying utensils, may provide a pleasant alternative to the expense of constantly dining out.

These residential units are marketed in a number of different ways. The one most relevant to the text of this article involves short term rentals, both daily and seasonal. This is the use the diver package explores. But the units are also available for sale as condominiums and as interval ownership. I mention this primarily be-

cause the real estate sales included within the resort might frighten potential customers for the short term rentals. I know I would be hesitant to take my vacation anywhere where I felt I might be subjected to a heavy and unavoidable sales pitch. This was an area I explored extensively in my interview with the Marr family and now feel assured that while there are sales personnel on the premises the vacationer will have to initiate the contact. A blatant sales hype is noticeably absent.

Key Largo is best known within the scu-

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- One Hour From Miami
- Premier Diving
- Deluxe Accommodations
- Daily, Weekly, Seasonal Or Select Ownership!



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- Featuring the *most complete* diving packages in the Keys...
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 - Resort & Complete Certification
 - Photography Instruction & Developing
- Two bedroom, two bath villas with color cable TV/Stereo, kitchen, jacuzzi & balcony.
- Overlook Pennekamp Park, Marina, pools, tennis and entertainment facilities.
- AND... *select ownership* invited from \$6,900.

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Dive Travel

By Amy Brown

The Perfect Florida Keys Vacation

The Florida Keys - especially the protected waters of Pennekamp Park off Key Largo - afford some of the best diving domestically. Now, in addition to the fine diving and supreme accessibility of Port Largo, you can enjoy world-class accommodations at the "sportsman's resort": Port Largo Villas.

Port Largo Yacht Club, Marina and Villas give you the best of both worlds. Having a marina and top-notch dive facilities at your doorstep, you can obtain a personalized, complete dive package to meet your needs. You can choose your dive operator, as well as small boat (holding up to six people) or a large one for transportation to the outstanding reefs, clear waters and prolific marine life of Pennekamp Park. And with Port Largo's wide range of photographic services and three-day instructional courses, you can also opt for a complete photo/dive package.

Then there's Port Largo's capacious, two-bedroom, two-bath condominium villas with color cable TV, stereo, even Jacuzzi. The accommodations make Port Largo ideal for professional groups - such as medical or photographic associations, clubs and couples. The attractive, tropically furnished villas with balcony overlook the Yacht Club and Marina. Tennis courts, two pools and outdoor entertainment facilities are just a short amble away from your villa. Après dive, you can relax in the newly completed lounge, "Coconuts," overlooking the Port Largo Yacht Basin.

Since Port Largo is just one hour from Miami, it is easy and economical to get to. So, the next time you yearn for a personalized dive vacation with world-class comfort - think of Port Largo. And get the best of both worlds.

Complete travel arrangements, including car rental, and immediate reservations by OceanQuest, Inc. Charge airfare on major credit card. Call toll-free 800/526-1394 or in New Jersey, Canada/Overseas call 201/744-5254.

Telex: 831383 STWS/Attn: OQuest.

Advertisement

PORT LARGO VILLAS

ba community as the site of John Pennekamp Coral Reef State Park. With over 100 square miles of beautiful, protected marine environment just offshore, the reefs of Pennekamp Park attracted over 500,000 divers and snorkelers last year. With so many divers seeking accommodations, it was natural for Port Largo Villas to establish close working ties with several of the dive shops in the Key Largo area. Each shop tends to offer slightly different services and specialties and availability may also vary. However, the principal dive/lodging package is being run in conjunction with Ocean Divers.

This is especially convenient in that Ocean Divers is nearing completion on a new 7000 square foot complex directly adjacent to the Port Largo Villas property. Easily within walking distance, the new complex will house retail dive equipment sales, scuba instruction, scuba and snorkel charters aboard either the 65 foot *Captain Crunch* or the 50 foot *Ocean Diver*, restaurant, fuel docks and sundry shops. In addition, there will be complete underwater photographic services available on the premises, including camera/strobe rental and sales, overnight E-6 processing and photo instruction.

The diving and lodging components of the package are obviously essential, but for optimum customer convenience the services of a knowledgeable travel agent are critical. By collaborating with OceanQuest in marketing their dive/lodging package, Port Largo Villas and Ocean Divers have gained the advantage of a toll free reservations number and the general expertise of OceanQuest's Frank Shane and Amy Brown in solving the typical problems besetting the average traveler. OceanQuest, in turn, gains the advantage of being able to book its customers into a luxurious accommodation with a professional dive operation, at a cost no greater than most motel dive packages. But the ultimate winner is the consumer. With one phone call a vacation may be booked to a true dive resort in the Florida Keys, and airplane tickets and car rentals obtained. All the other little details which conspire to plague a vacation may be resolved as well.

The day of the no-hassle vacation is here. For booking information, please contact OceanQuest at (800) 526-1394. For further information call Port Largo Villas at (305) 451-1196 or Ocean Divers at (305) 451-1113. 

NEW ZEALAND

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skin diver

CAREFREE CAYMAN DIVING

Take the plunge to world-famous dive sites each morning and afternoon aboard Cayman's largest, most comfortable fleet of dive boats. Twice each



Ron Kipp

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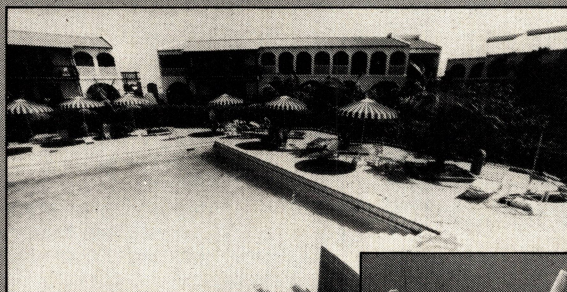
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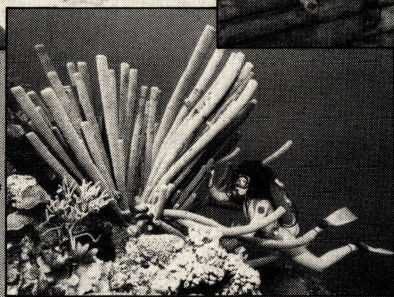
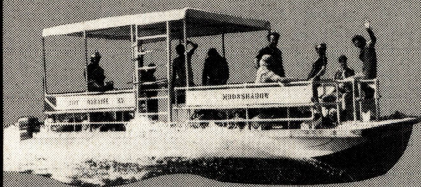
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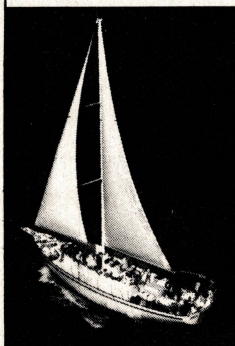
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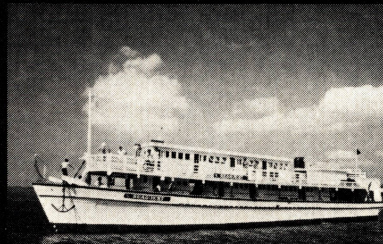
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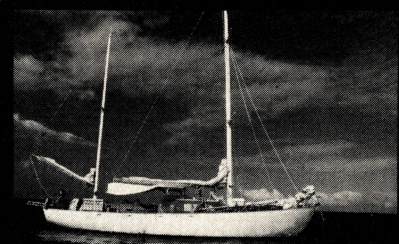
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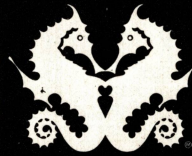
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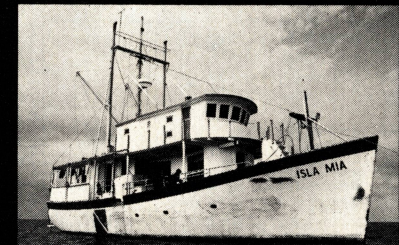
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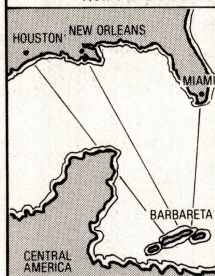
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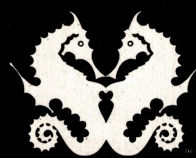
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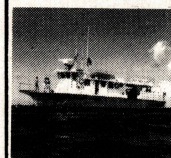


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NEW SURFSIDE OWNERSHIP

Surfside Watersports Ltd., one of Grand Cayman's oldest dive operations, has reopened under new ownership at the Galleon Beach Hotel on Seven Mile Beach. The new owner is Joseph Donohue, a PADI open water instructor and founder/owner of Northeast Divers Inc. in Scranton, Pennsylvania.

Harry Ward, previously with Surfside, has been named dive shop manager and will oversee the Galleon Beach operation.

Plans call for the beachfront dive shop to be renovated and a new compressor, modern fill station and increased storage tank capacity added. Surfside is currently using a 26 foot Bristol Blue Water flattop for daily morning and afternoon dive trips, and the operation's 26 foot custom dive boat *Surf Diver*, snorkeling boat *Fly Barge* and glass bottom boat are completely refurbished. A 38 foot twin diesel trimaran was delivered in March.

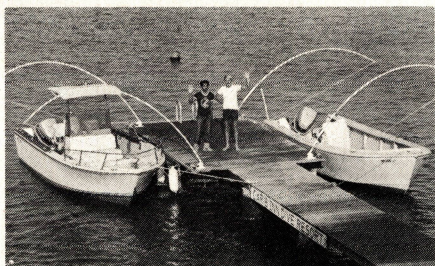
Surfside now offers morning two tank dives, afternoon one tank dives and night dives. Hobie Cat, Jet Ski and sailboard rentals are available through the Galleon Beach shop.

For information on dive packages offered in conjunction with the Galleon Beach hotels and nearby condominiums, contact Surfside Watersports, P.O. Box 891, Grand Cayman; phone (809) 949-2724.

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The Carib Inn, Bonaire, with the launching of its Robalo 256, has started a program of reef trips to Washington Park and other exclusive sites. These are all two tank dives with a maximum of six divers per trip.

In conjunction with the new boat, the Carib Inn has finished its own dock facility with a large pier extension now capable of handling its two boats. The Robalo has



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BAYMAN BAY MANAGERS

New Bayman Bay Club managers Bill Johnson (formerly of Ocean Expeditions) and Vickey Carey have taken over from retiring John and Liz Davies.

Bayman Bay is currently arranging special interest groups for the remainder of 1983, including marine biology seminars in the summer months.

To assist with reservations and travel itineraries, the Bay Club has set up an office in Ft. Lauderdale, Florida headed by Walt and Terry Strzalkowski. They and their staff can reserve an island cottage as well as book all travel connections. Call the Bayman Bay Club for further information on itinerary and programs at (305) 525-8413 or write to 3126 Bahia Mar, Ft. Lauderdale, Florida 33316.

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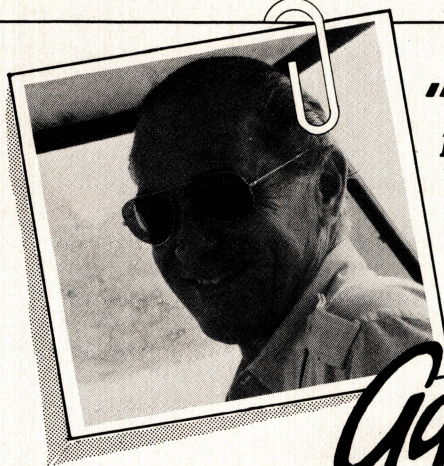
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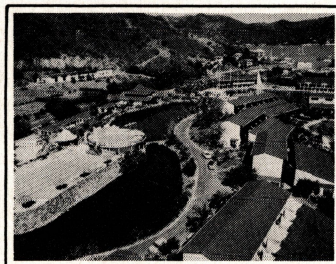
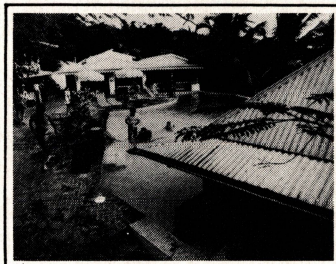
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from Pennsylvania dial: 1-800-362-5255

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RED SEA DIVER

Specialized dive trips in the Red Sea are now being offered aboard the 85 foot *Red Sea Diver*.

Outfitted for divers, the vessel features: expansive, shaded, open deck space



fore and aft; single, double and four berth accommodations (12 divers max.); dual 200 hp Rolls Royce engines and 1800 gallon fuel capacity for a range of 2000 miles at nine knots; three electrical generators; SSB and VHF communications; stabilizer unit; radar; autopilot.

For information contact Red Sea Diver, P.O. Box 420, Herzlia Bet 46130 Israel; telephone 053-96482.

ST. GEORGE'S LODGE

St. George's Lodge owner, Fred Good, and his assistant manager, Luis Cambranas, successfully completed the first NAUI instructor training course conducted in Belize. The course was run by Mark Novak and Bob Sheridan of Illinois.

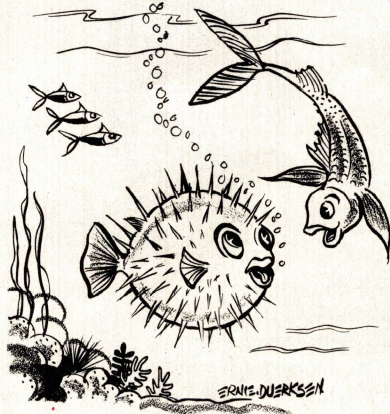
St. George's Island will be offering year-round certified dive programs and open water training.

For information contact Fred Good, St. George's Lodge, P.O. Box 625, Belize City, Belize, Central America. Call overseas operator 160+510+4190.

HASLETT TO BERRY SCUBA

Berry Scuba Resort of Crystal River, FL has appointed Bruce Haslett as operations manager. Haslett has been teaching in the area for a number of years. He has managed a variety of resorts.

As retail operations manager Haslett's duties will include overseeing resort operations and special tour arrangements as well as arranging group and individual training programs.



"It's got nothing to do with calories!"

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- **Luxurious seaside accommodations. An excellent restaurant featuring great food and complimentary wine.** An impressive bar/lounge overlooking the ocean. Nightly U/W video movies and slide shows.
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The Package*

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- Diving
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Royal Palms and Coral Caymanian
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- * Superior Ocean/Pool-view room
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*Your personalized dive vacation **package** is good through November 30, 1983. **8 days/7 nights** per person double occupancy. **Diving:** Six morning 2/tank boat dives. One single tank afternoon dive. **Unlimited** airfills for beach diving. One day free use of snorkel gear. **Welcome Rum punch. Not Included: Taxes, gratuities and transfers. Car Discount:** one day free with seven day rental. **Airfare from Miami** is included - (from Houston add \$123.00 to package price). All airfare subject to change. For group discounts and **non-diver** rates, please call.

Divers Unlimited
1-800/327-2740
In Florida 305/981-0156

OceanQuest, Inc.
800/526-1394
In New Jersey 201/744-5254

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GRAND BAHAMA WRECK

A new wreck and marine habitat was established off Grand Bahama late last year when an obsolete 230 foot cargo ship was sunk in 100 feet of water. The sinking was a joint project of the Underwater Explorers Society (UNEXSO), the Bahamas Government and the Bahamas Cement Company, the owner of the ship. The ship is now called Theo's Wreck



and is 65 feet from keel to superstructure, with a beam of 35 feet. It was built in 1955 and operated as a general cargo carrier in the North Sea for 15 years. In 1970 she was converted to a bulk carrier and hauled some five million tons of cement between the Bahamas and Florida. The vessel had been out of operation since mid-1980.

CHUB CAY APPOINTMENT

James White has been appointed dive director for Chub Cay Club, Berry Islands, Bahamas. He has taken over the duties of former dive director Dick Yax



who has become general manager of the Club. White is a PADI certified director from San Antonio, Texas.

For more information contact Chub Cay Club, P.O. Box 661067, Miami Springs, FL 33166 or call (809) 325-1490 or Miami Office (305) 445-7830.

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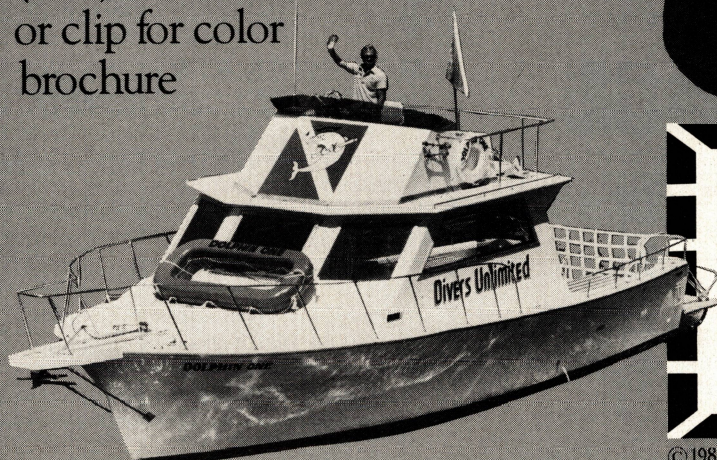
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• 1 night boat dive • unlimited shore diving • tanks/backpack/weight belt/surface buoy for shore dives
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\$599.00 per person, double occupancy
Includes round-trip airfare from Miami.

Add \$123.00 per person, double occupancy, from Houston.

Your dive boat will operate every day — GUARANTEED
Your room reservations are confirmed every day — GUARANTEED
Or your one-week diving vacation is free — GUARANTEED

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Write: Suite 205, 7220 N.W. 36th St., Miami, FL 33166.

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Each Morning
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APRIL 15/83 to NOVEMBER 30/83

Per Person Rates	Single	Dbl.	Triple	Quad.
8 Days/7 Nights	\$659	499	459	439
6 Days/5 Nights	519	399	359	339
4 Days/3 Nights	359	289	269	259
Extra Night	79	54	49	47

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CAYMAN PACKAGE

Through November 30 the Cayman Islander Hotel, Bob Soto's Diving Ltd., and Cayman Airways are offering the Bonus Scuba Dive Package in Grand Cayman. It includes air fare from Miami, air-conditioned room, Bob Soto's T-shirt, Friday night rum punch party, welcome cocktail, full breakfast, two tank morning boat dive (except on day of arrival or departure), one night dive and unlimited shore diving.

Packages are available for three, five or seven nights and are priced from single to quadruple occupancy. Group programs are also available.

For more information, contact Caribbean Hotel Management at 5920 Rodman Street, Hollywood, Florida 33023 or call toll free (800) 327-3835; in Florida (305) 620-6917.

AMISTAD SCUBA

A new dive store, Amistad Scuba (Del Rio, TX), has opened on Highway 90 West near the major entrances to Lake Amistad and the dam entrance to Cd. Acuna, Mexico. Featured is a dual compressor system. Air fills can be purchased on a special card plan to reduce the cost.

PADI instruction is available and as qualifications are achieved additional PADI programs will be implemented. A complete line of new rental gear is available including 50 aluminum tanks.

Amistad Divers will cooperate with area dive stores, instructors, and clubs including assistance with local reservations. For information contact: Amistad Divers, Star Rt. 2, Box 39, Del Rio, TX 78840; (512) 774-6422.

TRANS AIR

Trans Air, flying scheduled service from Fort Lauderdale to the Bahamas, is providing service to Marsh Harbour, Treasure Cay, Abacos, North Eleuthera and Governor's Harbour on Eleuthera. Trans Air can arrange all airline reservations, hotel accommodations, dive and sailing charters.

For one stop shopping to the Bahamas, call toll free (800) 327-7605, or your travel agent.

ANTHONY'S KEY SAFETY/RESCUE SEMINAR

Divemasters at Anthony's Key Resort in the Bay Islands of Honduras recently completed a safety/rescue seminar conducted by staff members of Human Underwater Biology (HUB). The specialty seminar, conducted during and at the conclusion of a week long Diving Medicine in Depth program for physicians, was taught by Dr. Robert Rutledge, a NAUI instructor and rescue specialist.

Herbie Jackson, Sammy Wesley and Dennis Anderson were trained and be-

came proficient in oxygen delivery systems, victim transport, CPR, advanced first aid, rescue and recovery and accident management procedures as they apply to scuba diving. ❧

OCEANQUEST TO BVI

OceanQuest, Inc. has established special fares to Tortola in the British Virgin Islands with Capitol Air and Air BVI. The special joint round trip Inclusive Tour fares via San Juan, are in effect currently from the following gateways: JFK-New York, Miami International, O'Hare-Chicago, and Boston's Logan Airport. Although this joint fare promotion is good from those selected cities, OceanQuest's computerized reservations can quote current



photo/Amy Brown

IT fares from most major cities through Miami or San Juan.

OceanQuest represents the 98 foot *Tropic Bird* for scuba vacations. The *Tropic Bird* departs on a weekly 8 day/7 night schedule Saturdays from Tortola, offering unlimited diving in the BVI. With 12 double air-conditioned staterooms, divers and non-divers enjoy ample living space with sundecks, living room, bar and pub, video and delicious meals.

OceanQuest reservations will handle all travel arrangements, including air fare to Tortola. For toll free dive travel reservations call (800) 526-1394 or in New Jersey/Canada (201) 744-5254. ❧

FLOATING IKELITE SERVICE

Fisheye Photographic Services of Grand Cayman, an Ikelite sanctioned repair facility, has announced a unique extension to its photo repair services. Effective immediately, visiting divers on the live-aboard M/V *Cayman Diver* who experience difficulties with Ikelite strobes will be able to get the same 24 hour repair service that land-based divers enjoy.

The *Cayman Diver* makes a photo-distress call to Fisheye, which then dispatches its dive boat *F-Stop* to pick up the broken strobe, and replace it free of charge with a loaner. Twenty-four hours later, the original strobe is returned.

In addition, divers aboard the *Cayman Diver* can rent or purchase a complete range of photographic equipment just by calling Fisheye, and a 24 hour film development service with pick-up and delivery by *F-Stop* is available.

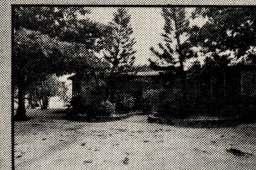
For full details of all Fisheye services, write to Martin J. Sutton, Fisheye Photographic Services, P.O. Box 2123, Grand Cayman, B.W.I. ❧

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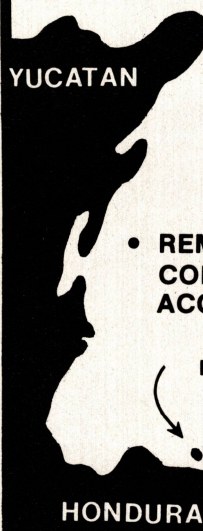
ON CAYOS COCHINOS ISLAND

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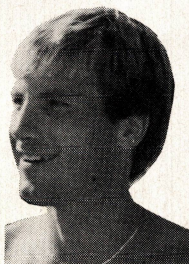
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SCUBA TOBAGO TOURS

BWIA International, in conjunction with Weekends Away Travel, is promoting new eight day/seven night dive tours to Tobago. The tour includes accommodations at the Crown Reef Hotel, round trip airport transfers, breakfast and dinner daily, welcome drink, 12 dives including boat, guide, tanks, weights, and air fills.

The newly remodeled and refurbished Crown Reef Hotel is an oceanfront resort set into Store Bay and offers 117 luxury suites and guest rooms, each air-conditioned with private balcony or patio.

Adventures Unlimited of Trinidad & Tobago, Ltd., the dive operation, is run by



Wayne and Karen Brown, originally from California.

The dive facilities are brand new, including the building with room for teaching, repair, maintenance and film processing; two new boats, including a 28 foot Pirogue; and all new equipment.

For more information, contact any travel agent; BWIA International; or the tour operator, Weekends Away Travel, 6015 Garfield Street, Hollywood, FL 33021—telephone toll free (800) 327-9543 (in Florida (305) 966-2777).

CAYMAN CHAMBER

December 1982 marked a decade of volunteer service by the Cayman Islands Divers, the islands' chapter of the British Sub Aqua Club, whose members have, for the past ten years, operated and maintained the dive community's two man, double lock recompression chamber at Cayman Clinic on Crewe Road.

The chamber is housed in a small building behind Cayman Clinic in space donated by Dr. James St. C. Polson, Cayman's only hyperbaric physician, and attending physician for chamber cases. The unit is staffed by 27 qualified chamber operators who offer volunteer services 24 hours a day for emergencies. The majority of chamber operators are members of Cayman Islands Divers.

To date, only 76 victims have required the services of the recompression chamber, a statistic which reflects the safety record of Cayman's dive industry.

Smuggler's Rest Dive Resort

New Providence Island, Bahamas

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in "The Tongue of the Ocean." Four day, 3 night packages include 2 days boat diving (3 80CF tanks daily), large deluxe bungalows with AC, TV's, equipped kitchens, MAP, unlimited tanks and transfers. Have an "outback" vacation with NASSAU CASINOS, shopping, and night life only minutes away. MODERN boats and equipment. Casual atmosphere, excellent food and congenial people.

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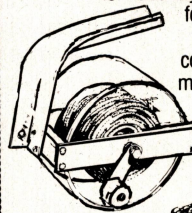
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Dacor Self Draining Snorkel, All New 11.95
Tekna T-2610 Maximum Indicator Depth Gauge 59.95
Dacor Soft Band Conversion Kit 21.25
Sherwood 250 Foot Wrist Depth Gauge 29.95
Dacor DTK Turbo Fins Adjustable Strap 21.50
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Call **800-621-6019** This is BERRY SCUBA'S Toll Free order phone. Order with Visa, Mastercard or C.O.D. Have the charge card and your Scuba Certification Card handy. Tell the operator the product number, color, size, etc. Manufacturer, description, and price. NOTE: This is an order phone only! Operators have no prices or stock information. For this information call our HOT LINE at **312-763-1626**. This is a direct line to our mail order desk! They can give you up to the minute information and answer ALL your questions! They can also take your order and will issue you a credit towards the cost of your call (if you place an order.) If ordering by mail, send orders to Berry Scuba on Northwest Highway in Chicago. Underwater Life Support Systems are potentially dangerous to a non-trained (non-certified) user. These items include regulators, tanks, and B.C.D.'s. This ad does not constitute to sell items in this ad via mail order.

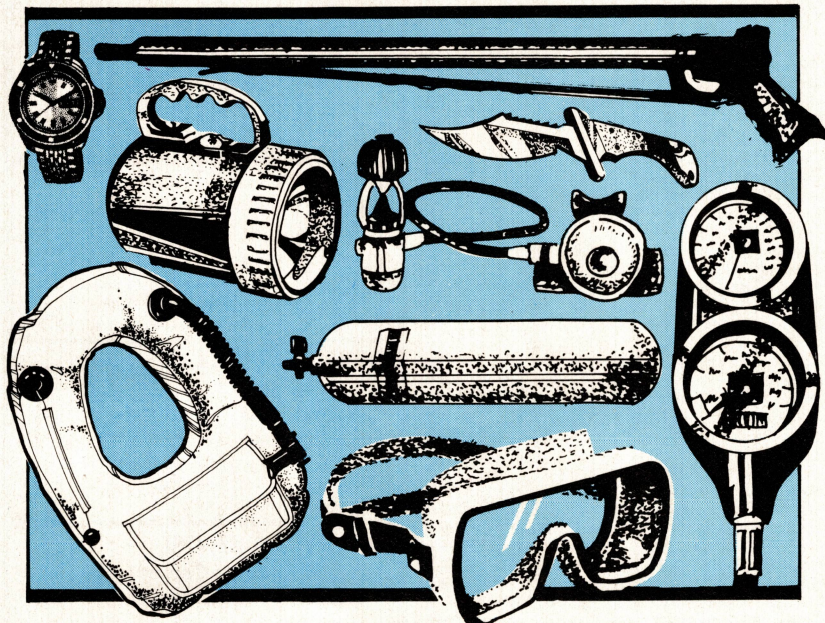
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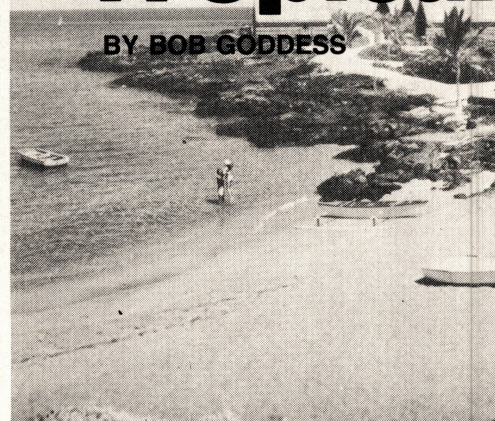


Life support equipment should not be used or operated unless you have taken qualified instruction and certification. This ad does not constitute an offer to sell via mail order.



Tropical

BY BOB GODDESS



For many of you, a tropical dive vacation is no doubt your single largest annual expenditure. Knowledgeable planning will result in lowering your overall costs while increasing your enjoyment. The key word in this article is *planning*—the secret to a successful trip.

Actually there are only two ways to ensure a successful dive vacation: (1) utilize the services of a specialist; or (2) be personally prepared to do adequate planning and allow yourself lead time in terms of months. With careful planning, you can virtually eliminate the travel horror stories we all hear much too often. There are a number of factors to be investigated, considered and planned for: lead time (resorts and airlines), seasons, types of diving available, costs, money, packing, language barriers, security, safety.

Lead time: resorts: Because most areas have peak months, top resorts in these destinations often fill up four to eight months in advance. Plan ahead.

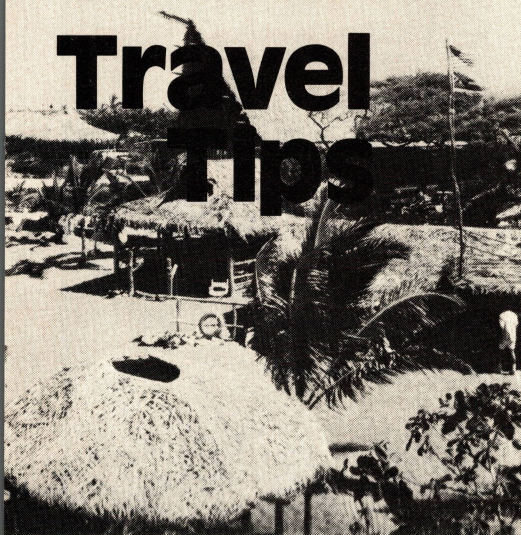
Airlines: The lowest priced seats (usually a small allotment) fill up first, often eight to nine months prior to departure. By getting ticketed as early as possible, you are protected against air fare increases, etc., and should the carrier discontinue flights to your destination, you will be protected on another carrier at no additional cost. Hint (pertaining to foreign carriers): Know the airline's reputation for promptness and avoid tight connections. Allow yourself time to connect, as many flights typically arrive over an hour late.

Seasons: Proper planning on seasons is indeed difficult, for many remote areas do not have easily accessible weather charts and those available can be very misleading. A few samples of this:

Roatan: Official charts are kept only for the capital city, Tequeigalpa, only 150 miles from the island of Roatan. What the charts don't show is that Tequeigalpa is on the other side of a mountain range, resulting in a reversal of the rainy season between Tequeigalpa and the islands.

Fiji: Most resources only show weather history for Suva, on the east side of the

Travel Tips



island and indicate a definite rainy season. Many visitors, however, dive only off the west side of the island where there is no real rainy season.

Grand Cayman: A destination where wind factor is important if you plan on diving the North Wall. November-March this wind may well keep the boats from visiting this area. Determined to go to Cayman in December for diving? Simple, just stay on Cayman Brac or Little Cayman; the boats can always get to the lee side of these islands for super wall diving.

Tobago: You must consider the rainy season on the mainland mountain areas. Tobago lies off the coast of the Orinoco River and the run-off during the rainy season will destroy the great underwater visibility you anticipated.

This list can go on, destination by destination. Be aware that some areas have a rainy season, some don't; some areas have a windy season, some don't; etc. Weather in the tropics is unpredictable. Consult an expert. With careful planning, you should never miss a dive owing to weather conditions.

Types of diving available: Decide on the type of diving you wish and then learn what each destination has to offer. Do you want walls, wrecks, etc.? Do you desire an operation where the day is spent on the boat or do you prefer to return to the hotel for lunch? On the same island there are often different dive operations running different itineraries.

Costs: Beware of low advertised prices! Does the price include roundtrip airport transfers (\$5-20); hotel taxes (3-10 percent); gratuities (10-15 percent); local government surcharges; one, two, three, daily dives or unlimited diving; no meals, some or all meals?

Let's assume the advertised price includes accommodations, two dives daily and two meals daily (MAP) but not transfers, taxes or gratuities. In addition, let's assume you desire three dives daily, one night dive and lunches. To compute your actual costs, take the advertised

(Continued on Page 140)

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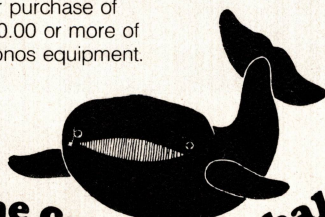


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the creative whale

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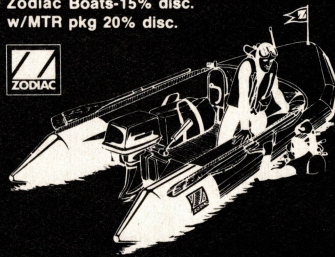


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Zodiac Boats-15% disc.

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1081 USD Conshelf XIV Reg.	118.00
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CUSHMAN RE-ELECTED

At the annual National Association of Diver Medical Technicians (NADMT) directors meeting in New Orleans in February, NADMT founding president Larry Cushman was re-elected for a second



term. Cushman is president of the Ocean Corporation, a commercial diver training school and diving service company in Houston, Texas. He is also president of the Association of Commercial Diving Educators (ACDE) and the National Association of Underwater Instructors (NAUI).

Dr. David Youngblood, Jabe Wills and Dr. Gordon Daugherty were also re-elected as NADMT vice president, secretary and treasurer, respectively.

NADMT is a non-profit professional association dedicated to the support of commercial, scientific and research diving safety through the standardization of high quality diver medic training and the issuance of national certification to recognized dive medicine training facilities, diver medic instructors and diver medical technicians. The association is endorsed by the Undersea Medical Society and the Association of Diving Contractors.

Divers, emergency medical technicians, paramedics, nurses, hyperbaric chamber technicians and others interested in learning more about NADMT or wanting to receive the association's quarterly newsletter, Triage, should contact NADMT at 5709 Glenmont, Houston, Texas 77081.

OUTSTANDING SHERWOOD DEALER

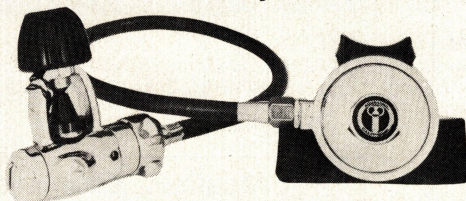
Scuba Sports of Miami, Florida has been named Sherwood Selpac's outstanding southeastern scuba dealer for 1982. Owner Lenny Panisch was cited for his outstanding performance in sales, market development and service.

Since becoming a Sherwood dealer in 1977, Scuba Sports has expanded from one retail store to three; in North Miami Beach, Coral Gables and Perrine.

Each Scuba Sports store is a full-service retail dive facility offering scuba instruction, air fills, equipment rentals sales and repairs. The stores have become major suppliers for Sherwood customers both in Miami and in Latin America.

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\$124.95



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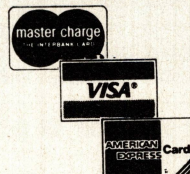


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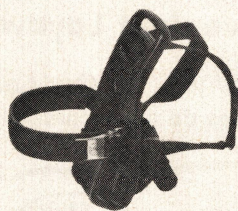


Enjoy real diving freedom with an unlimited air supply! It's compact and lightweight. You can take it to your favorite dive spots.

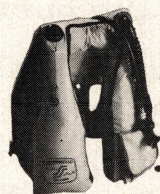
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HOLIDAY PLANNING

(Continued from Page 137)

price of (let's say \$500) and add transfers (\$10), hotel taxes (\$35), government tax (\$35), gratuities (\$75), one extra dive per day for six days (\$60), one night dive (\$25) and six lunches (\$30). A \$270 total, which now brings the \$500 price to \$770, a 54 percent increase in the original price. Let me emphasize, these figures are very realistic and very possibly on the low side.

Low advertised prices can look great at first glance however, to avoid those devastating financial surprises, you must research what is included in your package, before you arrive at the resort.

Money: Bring as little cash as possible. Bring the right type of travelers checks (not all travelers checks are acceptable at all destinations). Before you depart, find out which foreign banks can replace any lost checks. In many foreign countries, you can get a better exchange rate on travelers checks and vice versa.

Packing: The trick here is simple—bring everything you need but don't overpack. Excess luggage is tough to handle and keep track of and overweight charges run 15-45 cents per pound.

Never check luggage through international connections—claim it and recheck it on the international flight (especially when changing carriers).

Never let your luggage remain unguarded and out of your direct sight.

Carry-on personal medications—if lost they may be difficult, if not impossible to replace.

Hand-carry your mask or use the small Pelican box (a great \$12 investment).

Before packing, loosen sealed lights, strobes and camera housings—a good practice to avoid any possible airplane pressurization problems.

Pack lightly. At most tropical resorts you will literally live in a pair of shorts, T-shirt, sandals and sunglasses.

On beach entry dives use fins that require use of a boot. With tropical full foot fins you will be forced to make beach entries barefooted—potentially a great way to ruin a week of diving.

Mark all your gear before leaving home. Everyone on the boat will appreciate this.

Bring extra mask and fin straps, plastic tie downs, mouthpiece and exhaust pieces, small tool kit, extra buckle, etc.—another great use for the Pelican box.

Photographers: Instead of large fiberglass camera cases, buy an ice cooler. Pack it with foam and use it to ship your camera. It will be impervious to weather, cheap and doesn't advertise "expensive cameras enclosed." Upon arrival, it reverts to an ice chest. Try it.

Never seem to have enough luggage space on your return? Bring a large mesh goody bag and a plastic garbage can lin-

er. Insert the liner into your goody bag; throw in your laundry and other non-breakable items and presto—an instant travel bag which took no space to pack and weighs less than one-half pound.

Care to sell some gear? Seek out buyers for your equipment and by the trip's end you'll have a buyer lined up for most of your dive gear. Remote tropical areas have many local divers delighted to buy items difficult for them to obtain normally.

Security: Deposit most of your cash, travelers checks, passport, airline tickets and jewelry in the resort's safe upon arrival. You won't need these things during the day, so why leave all your valuables in your room?

Safety: Like most cold water divers, concerned about the dangers of diving in tropical areas, you worry about stonefish, barracuda, sea snakes, eels, sharks, etc. While diving I have been surrounded by large sharks, been nose-to-nose with moray eels, eye-to-eye with five foot barracudas, and had sea snakes swim between my legs, and photographed the eye of a stonefish with a macro lens, yet never encountered any problems with any of these species. Why no problems? Because I never tease or aggravate a potentially dangerous animal. The key to awareness of dangerous fish and other sea life is to know what to look for and what not to touch. The dangerous aspect of warm water diving is over-confidence and lack of awareness of the tremendously comfortable environment in which you will be diving. In 80° F crystal clear water, your capacity to greatly increase bottom time is phenomenal. Sixty minute dives are commonplace; dropping to 100 feet is a breeze and going to 160 feet is equally simple. At these deeper depths there is very little psychological uneasiness—eventually leading to becoming overly secure and comfortable. The result—too much bottom time and the nearest recompression chamber is 1000 miles away.

To summarize, remember: Look into possible, language barriers. Plan months in advance to ensure obtaining the best air fare and resort rates. Investigate and analyze your projected actual costs versus advertised costs. Determine the types of diving available. Thoroughly research seasonal weather data. Carry minimal cash and readily accepted travelers checks. Be knowledgeable on local marine life and remember to pack lightly.

The best way to reduce the time required to properly plan a tropical dive vacation is to utilize the services of a professional dive travel agent. At no cost to you, the traveler, he/she utilizes his/her influence with the resorts to obtain the best accommodations and the highest quality boats. And, most importantly, travel agents are constantly updating their broad areas of knowledge on all tropical dive destinations.

Remember, dive tour travel specialists are in the service industry. 

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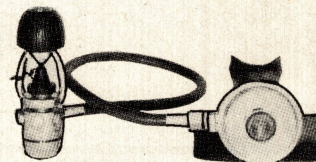
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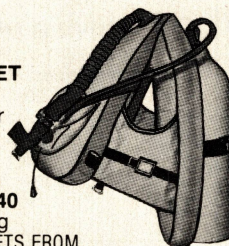


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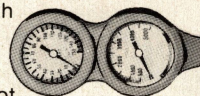
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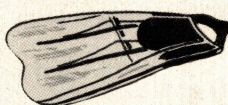


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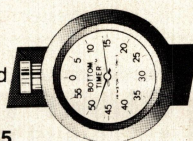
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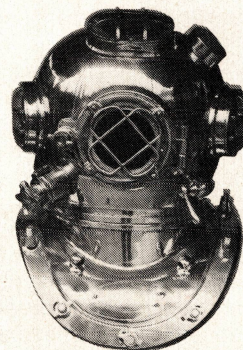
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Probing The Mysteries OF BLACK DIAMOND TUNNEL

BY SCOT SMITH

In early 1830 a dreamer by the name of John C. Calhoun envisioned what was considered by many a foolish venture: A new artery of commerce for the booming South. His dream was to build a railroad that would connect Cincinnati, Ohio with Charleston, South Carolina.

It took over 30 years and millions of dollars (back when a dollar was a dollar), but Calhoun would not be swayed until his dream had become reality. Lacking modern technology, all trestles, tunnels and rail beds had to be built by hand—no small feat!

Surveyors decided that it would be easiest to bypass the Smokey Mountains and dog-leg the rail line more southerly through northeastern Georgia. Here the mountains were not so formidable and the valleys and passes not so deep. Both slave labor and Chinese worked constantly, sawing, chopping and blasting their way toward Charleston.

Unfortunately, no one could foresee the troubled times that lay ahead for our young nation. With the onslaught of the Civil War, picks, axes and black powder were put aside. All construction came to a somber halt. Instead of the sound of blasting echoing through the mountain valleys, the roar of distant cannons took its place.

Years passed and John C. Calhoun's dream was either a faint memory or completely forgotten by most.

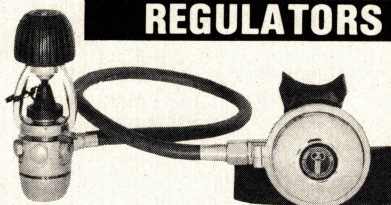
One summer day, while longing for some new adventure to embark on, this diver was confided in by a local mountain man of the tunnel's existence.

No sooner had he finished his story, than this young instigator was out on the mountain lake, full of summer retreats from the city life, drumming up interest among his friends to join in on this new,

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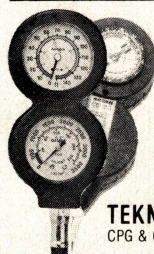
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BLACK DIAMOND

challenging search. Three hours and two canoes later, we were ready to travel to the nearby town of Clayton, Georgia in pursuit of our newest quest: Black Diamond tunnel.

The old mountain man had informed me that the tunnel had filled with subterranean ground water. The mouth was alleged to be only inches deep, but supposedly as one proceeded toward the rear, some mile beyond, the water level constantly increased until, at the end, it met the tunnel's ceiling. Tales of tools and equipment left behind only fueled the fire of our curiosity.

Now that we knew of the tunnel's existence, the only barrier in our way was pinpointing its location. Unfortunately, the old man only knew the general location, he could not give exact directions. He recalled traveling there as a boy many years before and that was all. For hours we drove around the rural countryside asking questions of farmers in their fields and quaint country ladies wearing calico bonnets out of the past.

Everyone claimed to have heard of the tunnel, but no one could actually tell us where it was. Just when we began to feel like giving up, we encountered a farm house down a remote, forgotten country road. There, sitting on the porch with his sons, enjoying the last rays of afternoon sun, was Beecher Bleckley.

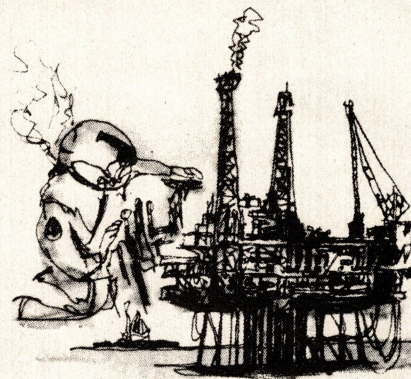
Beecher (as I've grown to call him fondly), after closely appraising the car load of city boys, said that indeed he did know the tunnel's location, but to get to it there would be a slight charge of \$1 per person to cross his land.

He directed us through a gate and beyond his cow pasture to a cove in the mountain's side.

The years had taken their toll on the rail bed, now filled with branches and fallen trees. Hauling our canoes over, under and around the clutter only heightened our anticipation.

Finally, the tunnel was within reach. Blasted out of solid granite, the stability of the excavation was only slightly in question. There it lay, stretching far into the darkness ahead.

After the customary thank you's we launched our two canoes, and with lanterns lighting our way, proceeded down the passage. Sure enough, as we paddled onward, the bottom dropped down and down. The cold (50° F), crystal clear water beckoned to be dived. At the termination of the Black Diamond, where the tunnel's ceiling met the water, the mouth (some 30 by 35 feet in dimension) looked like a pinprick in the distance. Some 20 feet below we could see the wooden tracks used to shuttle the blasted granite



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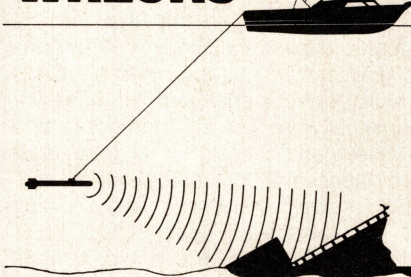
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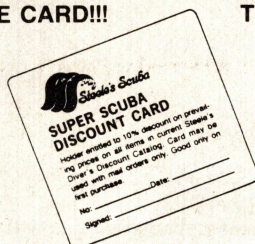
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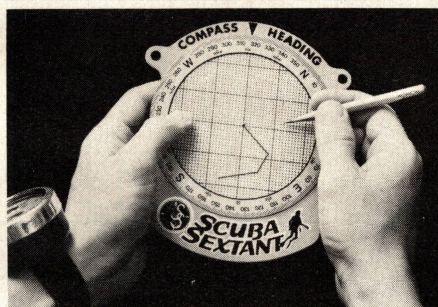
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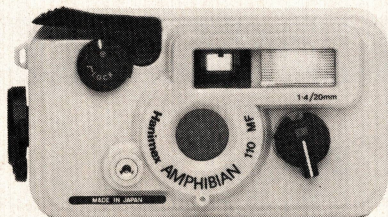
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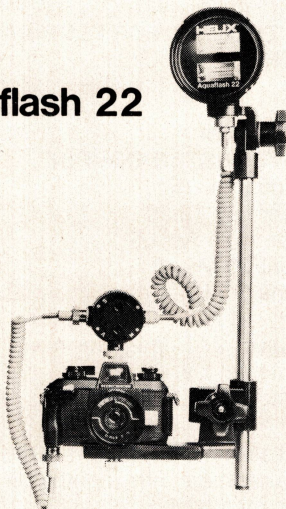
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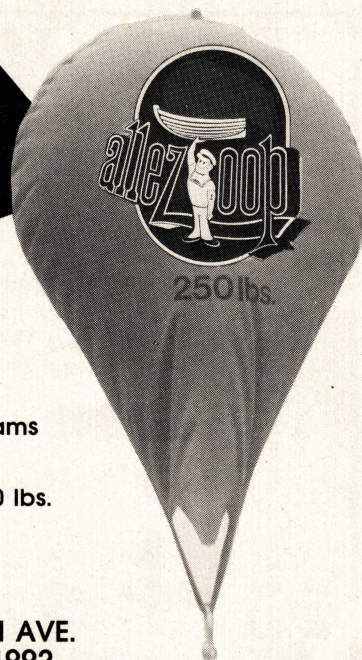
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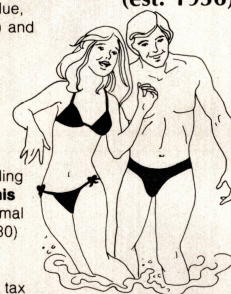
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BLACK DIAMOND

to the mouth. Tools and various indistinguishable outlines were strewn across the bottom just under a fine layer of silt and bat guano, for a huge population of bats had come to call the tunnel home.

It was several years before I ventured back to the Black Diamond, but dreams of submerged railroad memorabilia were always in the back of my mind. I was to be greeted by a rather pleasant surprise: Walt Disney Studios had used the tunnel in the filming of *The Great Train Chase* and had not only removed all obstructions to the tunnel's mouth but also had graded the rail bed making it easily accessible. We still had to pay Beecher his dollar, but it was as though the money were going toward the tunnel's improvement—well worth it!

After donning our gear, we entered the mouth of the tunnel. Black, deep mud with several spots up to the waist seemed to have been put there on purpose to impede our progress, but finally we located a semi-firm route on the tunnel's edge. On top of what had once been a dock, now concealed below several inches of smelly black goo, we carefully made our way inward. Soon the water was up to our waists and we were able to begin the long swim in.

Several hundred feet from the entrance the water's depth was approaching ten feet deep. After surface diving to the tracks below, we continued our penetration underwater. I had been right! Hammers, chisels and pickaxes were seemingly everywhere!

It was as though we were drifting back into history: In the back of my mind I could smell the coal oil lamps and hear the constant picking away at the mountain beyond. The water's visibility was around 50 feet (incredible for most Georgia diving), and both my companions and myself were savoring every kick, not knowing what lay just ahead.

After what seemed an eternity, and without the tunnel's end in sight, this trio turned and retreated to the warmth of the summer's sunshine outside.

Numerous dives and artifact discoveries later, the Black Diamond is still a favorite dive of mine. The artifacts that were first located far within the tunnel are still on display as they rightly should be: Deep within this north Georgia mountain.

Only recently has the exact length of the Black Diamond been determined. On a fall weekend trip to the tunnel, this diver reached the end, over a mile into the mountain.

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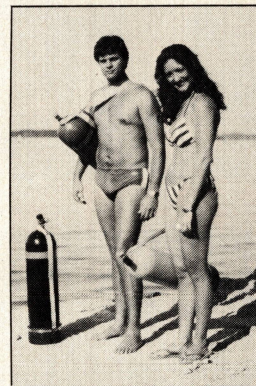
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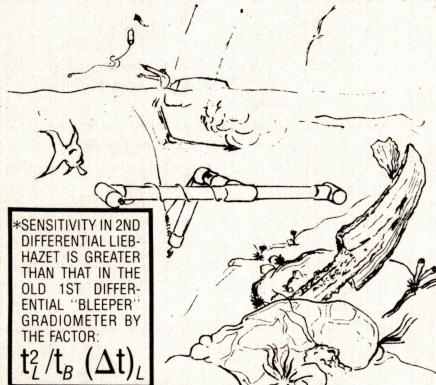
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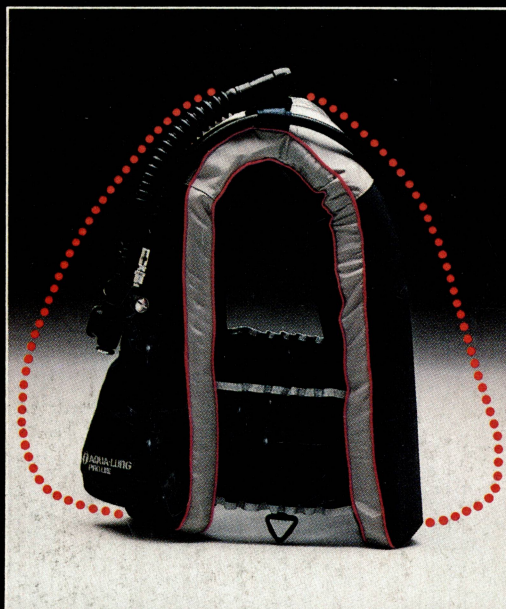
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